The Builder.

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ILLUSTRATIONS.

Palazzo Municipale, Piacenza.....Drawn by Mr. W. Curtis Green.
New Packing Warehouse and Offices, Manchester.....Mr. H. S. Fairhurst, A.R.I.B.A., Architect.
Broomholm, Nairn
House at Nairn .....Mr. W. R. Davidson, Architect.
Linkside, Nairn

Illustrations in Text.

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Reason and Tradition.—II.

IN his book on "Reason in Architecture," referred to at length in our last issue, Mr. Jackson, in addition to expounding the "reason" in Gothic architecture, refers also to its suitability as the architectural expression of an epoch of strife between jarring nationalities. Under the Roman empire the political and social rule was the same everywhere; the theory of life which centred everything in the Imperial city was reflected "in the monotony and unchangeableness of the companion architecture." This monotony was no longer suited to be the exponent of a disorderly society in which every man thought for himself and claimed a more or less complete liberty of action. Gothic architecture, he says, corresponds to the social condition of the Middle Ages; "it is the style of Individualism; it is bound by no rigid formula; it can adapt itself to any conditions, however novel." That is true if we speak of the individualism of nations or societies; in any other sense it strikes one rather oddly to find individualism specially connected with an architecture which, in each of its national developments, went so much by habit and custom that to this day we hardly know whether there was any person who could be called the individual or personal architect of a mediæval church or cathedral; at all events we know of the names of none, for even of the names that are connected with the foundation or rebuilding of some of the cathedrals we do not really know whether the person named was actually a designer of the building, or whether he merely ordered it or furnished the funds. In the usual sense of the word "individual" it was the Renaissance which was the era of individualism; it was then that architecture first became, since the decline of Rome, the work of personal architects, who had each his own style of working, and whose names are historically connected with their works. And it is this very fact of individual personality which Mr. Blomfield puts forward as the motive for his "Studies in Architecture." It is for the want of this, he thinks, that architecture is not popularly interesting to the same extent as sculpture and painting; "the vital interest of architecture is the human interest, the play of personal temperament, which is as clearly traceable in the works of architects as in those of painters and sculptors." As far as Renaissance and post-Renaissance architecture is concerned this is perfectly true; we have many times in these pages maintained that, since the Renaissance, architecture has become a personal and not a national art, and must for the future be so, because the spread of education and inter-communication has rendered for ever impossible that naïve and half-unconscious carrying out of its own practice by each nation, undisturbed by any direct influences from without, which characterised the Middle Ages: The civilised world has become too self-conscious for that now; and the people who dream that architecture will have a new life if we can once get rid of the personal architect and go back to the unconscious evolution of architecture out of construction, are Utopists who are supposing the impossible. It is right that this should be recognised; but we think the distinction should have been drawn between pre-Renaissance and post-Renaissance architecture. If educated persons cannot find interest in the development of architecture as a national art during the Romanesque and Mediæval period, when the personal element is non-existent or at least unattainable, it is the fault of their own dulness, and they ought not to be encouraged to think that the history of architecture is only interesting when they can trace the influence of the personal architect. To some minds, at all events, the national development of architecture is of wider and deeper interest than the personal.

For the study of the modern epoch, however, it is quite right that the interest and importance of the personal element should be emphasised. So that, for the present and future of architecture, we have to consider not only reason and tradition, but individual choice and taste, which will not now submit to be pushed aside and sacrificed to a purely national development of architecture, even were this not rendered impossible for the present day for the reasons just mentioned. We have to strike a balance between these three influences:

But before attempting to sum up that question, let us give a little attention to some of the details of Mr. Blomfield's very interesting book. The six Essays contained in it—"Byzantium or Lombardy," "Andrea Palladio," "The Architect of Newgate," "A Hundred Years of the French Renaissance," "Philibert de L'Orme," and "The Italians at Fontainbleau"—are connected, as we read in the preface, "rather by the method of treatment attempted than by subject"; the method being that already referred to, of finding the personal equation of the architect, reading his personality in his works, and finding a clue to his works in his personality. On this system it seems rather difficult to connect the subject of the first essay with those which follow, as it is largely concerned with a question raised in Signor Rivoira's recent work, "Le Origini della Architettura Lombarda," whether the buildings at Ravenna in what we regard as Byzantine form were not really the work of Italian architects who accompanied Honorius from Milan; with the corollary that the architecture of S. Sophia itself was borrowed from Italy or carried out by Italians, and all the subsequent domed Romanesque architecture really a continuous Italian development and not Byzantine in the true sense at all. And this of course is a question of national influence and history rather than of personality. But when we come to S. Sophia itself, with which the latter portion of the chapter is concerned, the personal element does enter into the subject, for though we know no more of the architects of S. Sophia than their names, we do know that they had an individual and personal part in the design, and we can recognise (as before observed) that S. Sophia is in its main design a distinct and at the time a new idea in architecture on a great scale: so that in this sense the personal element comes into the subject.

As to Signor Rivoira's historic theory, it appears to us to be a tolerably arbitrary assumption by an Italian who wishes to establish a purely Italian descent, a direct heritage from Rome through Italian builders, for all Western Romanesque architecture; and we should regard it, as we gather that Mr. Blomfield does, as a theory in the highest degree improbable, not to say impossible. As Mr. Blomfield truly says in another portion of the chapter, the vital distinction between styles is to be looked for not so much in details as in planning and construction, which represent the underlying thought in the building. There are decorative carved details in Hindu architecture which are very like Greek, but there is no resemblance in the general architectural idea; nor is there any resemblance between the general architectural idea of S. Apollinare Nuovo and S. Vitale. Signor Rivoira's thesis seems to be that of a patriotic Italian, who would fain claim for Italian genius everything that has been built upon Italian soil. The supposition that S. Vitale was the work of Italian artists educated at Byzantium does not help him much, for in that case it would remain practically Byzantine in its origin. In regard to the mausoleum of Theodoric, with its monolith cupola, Mr. Blomfield explains it as the outcome of "the strong-willed ignorance of the builders," who had lost all knowledge of Roman concrete vaulting, but wanted a monumental roof which would exercise no thrust, and got one in this manner, so wasteful of material and of labour, and which on a slightly larger scale would have been impossible with any kind of stone. It bears somewhat the same kind of resemblance to scientific vaulting that a "dug-out" canoe does to scientific boat-building; and, like it, implies a low state of knowledge; it is barbaric architecture. Signor Rivoira, we may say, is not the first to have made the suggestion that the projections like *acroteria* on the upper surface of the cupola were intended as handles or means of attachment for lifting this immense piece of stone into its place; we have met with the suggestion many years ago; and we do not think it so improbable as Mr. Blomfield seems to consider it.

It is a huge step from S. Sophia to Palladio. Fifty years ago, indeed, anything like a serious consideration of Palladio would have been thought absurd; his name was a byword with the modern Gothic architecture and the ecclesiological amateur, who would have greeted any reference to him with a "retro Sathanas!" Nor are we disposed to think that there is any great lesson for modern architecture to be learned from him. Yet no man fills so large a place in the history of a great subject as Palladio for a long time filled in connexion with modern architecture, without some reason, sufficient at least to his contemporaries and immediate successors; and it is worth while to inquire how he arrived at so large a reputation. Mr. Blomfield suggests that there is a good deal of good luck in his as in some other reputations, and that his writings were the principal factor in his success.

> "His four books on architecture appeared at the precise psychological moment. Somebody was wanted to sum up the result of the last hundred years of work. The great effort of the Renaissance was over. That whirlwind of energy which had swept through every nook and cranny of the arts was nearly spent, the reaction was setting in, and of that reaction Palladio was the nice exponent. More neat and orderly in his methods than Serlio, more comprehensive than Vignola, with the touch of pedantry that suited the times and invested his writings with a fallacious air of scholarship, he was the very man to summarise and classify, and to save future generations of architects the labour of thinking for themselves. After the days of the intellectual giants came the schoolmaster to put everything in order. What to them had been facts and vital elements of expression were now to be docketed as abstractions. Architecture was to be put into a strait waistcoat in order to keep it respectable and adjust it to the standard of the virtuoso."

As Mr. Blomfield observes, "the result is rather depressing," and the Italians soon emancipated themselves from Palladianism, and underwent a reaction in the direction of extravagance. So did Wren also decline to be bound by the conventional rules, but without rushing into extravagance. He was a great and original architect, who used the Palladian materials to express his own ideas. The criticism against Palladio, that he designed on paper without consideration of material—in other words, that he ignored the relation of material to design, it is perhaps hardly fair to apply to him more than to many other Renaissance architects. Wren had the good fortune to be able to build his churches mainly in Portland stone; but if they had all had to be carried out in cement, would the designs have been different? But Palladio was much more the slave of the Order than ever Wren became. He could do nothing without the Order; he could not even break away from it to make a solid angle to a building. In the interiors of San Giorgio and Il Redentore, too, it is quite curious to notice how the architectural design seems to stop at the cornice of the entablature; the vault is nothing but an arched space. Classic authority gave no precedent (as far at least as Palladio knew) for the treatment of a vaulted roof; accordingly it was left out of the architectural scheme; it was an unavoidable covering, and nothing more.

The chapter on "The Architect of Newgate" is of interest in regard to the answer which is proposed to the question—one which must have occurred to many students of architecture—how was it that Dance, who produced no other building remarkable for power or originality, should in this instance, and in the apparently unpromising subject of a jail, have produced a piece of architecture so remarkable for gloomy power and characteristic expression, so distinct from anything else that has ever been done in London? Mr. Blomfield contrasts Dance's treatment of Newgate with Soane's treatment of the Bank. Both architects had to make what they could out of a wall. Soane treated the Bank wall with devices which included sham window openings; "in other words, by means of the very architectural feature which the conditions of his problem forbade him to use." As a piece of one-story classical architecture the Bank is very successful, and in contrasting it with Dance's far more severe and massive treatment of the wall at Newgate, it should be borne in mind that, after all, a bank is not a prison. A bank should have the appearance of strength, but at the same time a bank represents wealth and prosperity, a prison represents crime and forcible detention. We see no objection to the introduction of the Order as a decorative treatment of the Bank wall; the mistake is that it is grace and elegance that are expressed in Soane's Bank, rather than strength. The true way would have been to build a strongly rusticated wall with a strongly rusticated order. Dance, in treating Newgate, as Mr. Blomfield says, attacked the problem squarely.

> "He had to build a prison wall, and a prison wall he meant it to be; but his mind, stimulated by a very extraordinary influence, so worked on the conditions that he produced what was perhaps the finest abstract expression of wall surface to be found in Western architecture."

And what was the "extraordinary influence"? That is the new point in Mr. Blomfield's essay. Dance's works were curiously unequal, but Newgate was his work when fresh from a visit to Italy made in 1758. In 1751 the first collected edition of Piranesi's works had been published in Rome by Bouchard, and among many inventions in the manner of the ancient buildings of Rome were included "Molti Caprici di Carceri sotteranei." The book made a great sensation, and Dance must have become acquainted with it and most probably

with its author. Fresh from this acquaintance, on returning to England, he had put it into his hands the opportunity to design a prison. What wonder, then, if he attempted to reproduce in these grim walls something of the spirit of Piranesi's "Carceri" designs? The explanation is certainly a probable as well as a very interesting one. However inspired, Dance made a wonderful success and produced a piece of architecture the destruction of which has been a great loss to London. It has been succeeded by a more grandiose building, crowned by a cupola, and in the lower portion of which there has obviously been the intent to recall something of the character of old Newgate. But it has nothing like the gloomy grandeur and expressiveness of the old building; how indeed could it have? It was the result of an architectural competition; and who, in a modern competition, would have ventured on anything so stern and uncompromising as Dance's Newgate? To have done so would have been to have courted failure as a competitor.

We can only mention briefly the two exceedingly interesting essays on "The French Renaissance" and on "Philibert De L'Orme," and must consider them with reference to the lessons to be drawn from them, and their bearing on our main subject, rather than in following out the history which they contain. The chapter on De L'Orme is the portion of the book which most completely illustrates the author's position as stated in his preface, that the real interest of architectural literature consists in realising the personality of the architect and tracing its effect in his work. This is particularly the case in regard to De L'Orme, who was a man of most decided and defiant personality, and engaged for most of his life in a fight with men and circumstances. Mr. Blomfield thinks he can hardly be called an architect of genius, though he deserves the praise of having been a learned and thoroughly capable artist. But we may say that he to some extent illustrates the union of the influences of reason and tradition. He was in the main a follower of the classic traditions of the Renaissance, yet in his expressed opinion at all events, as set forth in a remarkable passage quoted by Mr. Blomfield from his "Premier Tome de l'Architecture," it was better for an architect to fail in the ornaments of columns and facades, "ou tous qui font profession de bastir s'estudient le plus," than in those natural laws which concern the convenience of the inhabitants, and not the beauty of enrichments "faites seulement pour la contentement des yeux sans apporter aucun fruict à la santé et vie des hommes"; words which Mr. Blomfield characterises as "downright enough for the most hardened Philistine." But surely the real and most prevalent "Philistinism" lies the other way, in the preference of ornament to the sounder qualities of plan and structure. One of De L'Orme's own inventions, on the other hand, seems to illustrate the misapplication of "reason." This was his practice of emphasising, or as he said concealing, the fact of the jointing of the columns by an ornamental band in relief; a device which, as we know, is largely used in French Renaissance work down to the present day. We quite agree that it was an unfortunate legacy to French architecture; but it was an application of reason hardly so illogical after all. Columns cannot, with our building-stones, be made as monoliths; they must be in separate drums, jointed; *ergo*, let us make the jointing a feature of the column. It really looks perfectly reasonable on paper; unfortunately, as with some other perfectly reasonable proceedings, the result is ugly. Architecture doth not live by reason alone. This is a case in which a stricter tradition would have been a safeguarding influence.

The upshot of the study of the French Renaissance is that French architecture has adhered in the main to the classical tradition, with its sense of scale and dignity. "Versailles led on to the colossal stables of Chantilly, and no architect could have devised the scale of the new Gare d'Orléans who had not, to some extent, inherited the instincts of the author of that stupendous composition." The reference to Versailles, we presume, refers only to the older portion facing the Place d'Armes; Versailles towards the park is an example of a building vast in actual extent but rendered comparatively paltry in effect by the poor scale and style of its detail. One reason for the unbroken survival of the classical tradition in France is that the Gothic revival, which had also its day there, was never so successful as to gain the wide and general acceptance which it gained for the time in England. Its place seems to have been speedily taken by a kind of Byzantine revival, which still goes on, and is evidently generally regarded as the style proper for churches, as we see in the (to an English eye) dreadful church designs which adorn the architectural gallery in the annual Salon—bastard Byzantine, representing heaviness and clumsiness of detail without restraint or refinement. Here also a stricter tradition would have produced a better result; as it is, we have some of the forms (more or less bungled) and none of the spirit of Byzantine architecture. It is satisfactory to reflect how different is the principal effort at Byzantine tradition in England—the cathedral at Westminster; and the reason for its superiority, as Mr. Blomfield puts it, is that Bentley started from within, with a great scheme of construction; not with superficial features collected from other buildings. But this purely structural basis has not entirely influenced the exterior design, which is by no means so simple and inevitable as the interior. A more simple treatment, more entirely expressing the structure, would have made an even grander building of it. The interior is entirely according to "reason"; the exterior is not.

This brings us round to Mr. Blomfield's summary at the close of his Byzantine chapter; to the effect that if architecture is again to become a vital art, "it must dispense with the unessential, and address itself to the root of the matter, namely, to the task of finding the absolutely best expression for the constructive necessities of a building." That is, in other words, Mr. Jackson's "Reason" applied to building; and it tends towards what modern architecture perhaps most of all requires, the suppression of useless and unmeaning ornament; the regarding of a building as the expression of an idea in plan and structure, not merely as an opportunity for the decorative treatment of a wall. That is where reason operates. Only it need not be supposed that we are to leave our walls bare in all cases; there may be instances, as that of old Newgate, in which the severest treatment of a wall surface is the best and most appropriate; there are others in which a decorative effect is desirable. But neither is it necessary to vitality in architecture that we should attempt some absolutely new form of detail, or that we should scout an old form because it has been used before. That is where tradition comes in. An ancient tradition, like that of the Classic order, is a preservative against unrest and eccentricity, and connects the architecture of the present with the past. And so too with the tradition of domical building which sprung into almost perfect form in S. Sophia, and has never been carried further; is there not something more to be done with that tradition?

We do not need, nor is it desirable, to shake off the traditions of the past; we need only to use them in accordance with reason. They are the materials for our reason to go to work on.

NOTES.

Untidy Roads and Streets.

THE London County Council have issued a fresh series of by-laws relating to the throwing of litter and rubbish in the streets. The chief offenders in throwing paper in streets and roads are errand-boys from shops, who often have an extra wrapping of newspaper over the articles to be delivered, and dispose of this before or immediately after delivery. The by-laws seem cleverly drawn to leave out this class of offender. By-law (1) provides that no person shall sweep or otherwise remove from any shop, house, or vehicle into any street any waste paper, etc., or being a costermonger, newsvendor, or other street trader, throw down or leave in any street any waste paper, etc. The errand-boy often comes round on foot, and he therefore escapes the provisions of the by-law. The other clauses refer to throwing down paper for advertising purposes, and to fruit rind and dangerous material. So many of our large towns are defiled and rendered unsightly by the litter of paper blowing about that we could wish they would pass or enforce stringent by-laws in the same direction, whilst certain country districts—notably those visited by hoppers—also stand in need of protection from what is a real nuisance.

The Vrynwy Water Main Burst.

ALTHOUGH steel pipes were used in some parts of the original aqueduct from Vrynwy to Liverpool, cast-iron was chiefly adopted in the siphon, 17 miles 5 furlongs long, between Oswestry and Malpas, and the diameter of the pipes was reduced from 42 in. to 39 in. The maximum head of 480 ft., about 208 lb. per square inch, occurs at the Wych Brook, where the water is carried beneath the stream through steel tubes. In the

same siphon the aqueduct passes by cast-iron pipes in subways under the Oswestry branch and the Shrewsbury and Chester lines of the Great Western railway, and at Hindford the pipes are carried beneath the Shropshire Union Canal in a bed of puddled clay. Under the small stream, described as the river Elfee, the cast-iron pipes were encased in mass concrete, and this was the point where the alarming failure took place on Saturday last. Bursting out with an explosion that was heard throughout the valley, a column of water rose to a height of 100 ft., throwing up masses of concrete and pieces of rock, while many tons of earth were washed from the hillside into the river bed. It is stated that subsequent examination revealed the fact that a piece of metal, 2 ft. by 1 ft., had been blown from the side of the pipe. This mishap certainly points to the desirability of steel pipes in the case of all water mains under heavy pressures, and especially in positions where they are inaccessible except by tunnelling operations.

Girder Wind Bracing. IN the twenty-two story building erected for the United States Express Company, in New York, a somewhat unusual form of wind bracing was adopted by Colonel Wells, the structural engineer. In this case the building is surrounded by low houses, and no account was taken of the protection which they afford from the wind, the wind pressure being estimated at 30 lb. per square foot over the entire faces of the building down to street level. To provide for resisting the stresses in the framework, double lines of continuous main girders were disposed perpendicular to the street fronts. These twin girders engage the columns on opposite faces, and the connexions between them and the columns are made with deep plates riveted across the faces of the columns, and serving both as connexion-plates and as braces against wind stresses. In addition to providing for wind stresses this type of girder strengthens the building as so to obviate the necessity for knee-braces, diagonal rods, portals, and other systems of bracing which require special members or difficult connexions, and obstruct the interior of the building. The form of wind bracing here applied has the further advantage of avoiding tension in the rivet heads, and of transmitting the stress entirely through direct rivet shear. Consequently, it is economical both in construction and erection. More rivets are certainly required than in some other methods of bracing, but on the other hand they are all in accessible positions, and the columns and girders can be very readily assembled and connected during erection.

The Leeds Steel Aqueduct. FOLLOWING the example set in Bradford, the Leeds Water Committee have decided to lay a double aqueduct in steel pipe, more than 22 miles long, as a part of their project for bringing water from the Ure and Colster valleys. The first instalment of the pipe line will extend from Kettlesing to Kirby Malzeard, a distance of nearly 12 miles. It is stipulated in the contract that all the pipes shall be made in Leeds, and it is not improbable that the desire to protect local industries has had some influence on the decision to make use of steel instead of cast-iron. The latter metal is certainly less liable to corrosion than steel, although offering less resistance to sudden shocks. The experiment will be watched with interest by water engineers; and if carefully coated it is quite possible that the new pipe line may not suffer much more from corrosive action than one of cast-iron.

The New Goods Station, Newcastle-upon-Tyne. A BUILDING which has recently been erected for the North-Eastern Railway in Newcastle-upon-Tyne is undoubtedly the finest example of concrete-steel design hitherto realised in the United Kingdom. In expressing this opinion we are not influenced by mere dimensions, but rather by the magnitude of the loads to be carried and the importance of the main members of the structure. Briefly described, the building is a rectangular block about 430 ft. long by 180 ft. wide by 98 ft. high, including a low-level goods station on the ground floor, a high-level goods station on the first floor, and extensive warehouse accommodation on three upper floors. The floor of the high-level station is mainly supported by three rows of concrete-steel columns, of which every member on the central row has to carry the enormous load of 1,100 tons. The main and secondary floor beams are of proportionately massive construction, and some idea of their strength is conveyed by the statement that, in addition to a dead super-load of 3 cwt. per square foot, they are designed to withstand the moving load of six goods trains as well as the vibratory stresses due to the operation of turntables and heavy machinery for handling merchandise. At the height of 38 ft. above the floor of the station arched beams pass from wall to wall with three intermediate columns forming two spans of 37 ft. 6 in. and two of 52 ft. centre to centre, these beams forming the foundation for columns supporting the upper floor systems. A most interesting feature of the construction is to be found in the automatic flour store with a capacity of 16,800 20-stone sacks, and formed by a series of sloping floors, passing diagonally through three stories of the building. These floors are carried by some of the largest latticed girders that have ever been built in concrete-steel. The structure is one that thoroughly deserves inspection by all who are interested in the progress of concrete-steel construction. It was designed in accordance with the Hennebique system by Mr. William Bell, F.R.I.B.A., the architect to the North-Eastern Railway company.

Magnetic Alloys. THE discovery by Mr. Heusler two years ago that alloys containing manganese, aluminium or tin, and copper, were, in many cases, strongly magnetic aroused the greatest interest amongst electricians and physicists. The practical applications of these alloys have not as yet been of great value, but the discovery of a new family of magnetic bodies has opened out a new field of research in which important discoveries have already been made, mainly by Continental workers. M. Guillaume, the Director of the French National Laboratory, in a recent paper to the *Bulletin des Electriciens*, sketches out a theory which partially explains the known phenomena, and is a useful help in research work. He points out that Faraday many years ago had suggested that manganese and chromium might possibly be magnetic as they belong to the same chemical family as the magnetic metals. The apparent lack of magnetic qualities he explained by pointing out that iron at high temperatures lost its magnetism, and hence if the transformation point of manganese or chromium could be raised sufficiently high they would be magnetic at ordinary temperatures. M. Guillaume proves that this is exactly what Heusler has done. It has been customary to assume that the melting-point of alloys is higher than that of their constituents. This, however, is not the case. The alloys of tin and aluminium, the metals which are essential in making the manganese alloys magnetic, are found to be exceptions to the general rule. An alloy of aluminium and gold has a melting-point 17 degrees above the melting-point of gold, and an alloy of tin and sodium melts at a temperature 450 degrees above sodium, and 344 degrees above tin. It is highly probable, therefore, that the effect of the tin and aluminium which make refractory alloys, is to raise the temperature at which the transformation of manganese from the magnetic to the non-magnetic state occurs. It will be seen that this theory of M. Guillaume's makes the phenomenon of the Heusler alloys much less mysterious than it appeared to be when first announced. The salts of manganese and chromium also are quite as magnetic as those of iron.

Hatton Garden District, and Holborn Borough. IN October will be resumed an inquiry, held by Mr. F. J. Willis, barrister-at-law, and Dr. L. W. Darra Mair, on behalf of the Local Government Board, into a scheme propounded by the Holborn Borough Council for dealing with the area inhabited by what is known as the Italian Colony. The inquiry relates to a proposed rebuilding of about 130 houses and tenements in Warner, Summers, and Little Bath streets, Fleet-row, Backhill, Eyre-court, and Eyre-street-hill, with a re-arrangement of the streets. It is the outcome of an adverse report made five years ago by Dr. W. A. Bond, medical officer of health for the borough. Dr. Bond ascertained that a population of 1,100 lived in an area of less than 2 acres covered with small houses crowded together and in a dilapidated condition; the cellars served for living-rooms, the houses were damp, the drainage was in a bad state, and the sanitary provisions very imperfect. The inhabitants are mostly Italians having no settled industry, but trading as ice-cream vendors and itinerant barrel-organ players. During the past three months negotiations have been opened with the owners of the property, the greater portion of which belongs to a land society, and it is anticipated that in the result certain improvements will be effected by the demolition of many of the houses.

and the erection of business premises on their site, and by the alteration and improvement of the remaining houses. The area was formerly traversed by the Fleet-ditch when it ran as an open sewer, and in the hollow at the foot of the hill was the once notorious Hockley-in-the-hole. In his Annual Report for 1905 upon the Borough of Holborn, Dr. Bond states that the population of the borough was 59,405; of that total, 5,706 were foreigners—including 2,029 Italians, 1,098 Germans, and 660 Frenchmen. There were 147 inhabitants per acre in the borough, as compared with 61 for all London; 37·5 per cent. of the residents lived in tenements of only one or two rooms, and 60·1 per cent. in tenements of from one to four rooms. The death-rate in the Warner-street and Eyre-street-hill quarter exceeds that in the remaining part of the borough.

Castle Rushen, Isle of Man.

SOME excellent work has been done during the last two winters at Castle Rushen, Isle of Man, with the result that this interesting mediæval structure can now be seen in something like its original condition. The various small modern buildings which encumbered it have been cleared away, plaster has been swept off the walls, and the mediæval work has been restored to its original appearance. The immense fireplace in the kitchen, for example, has been veritably unearthed, for it was hidden away under cartloads of rubbish, and the arches and masonry in various parts, which were constructed in the XIVth century, now stand clearly exposed to view. The windows in the keep, which were enlarged when the castle was used as a prison, have now been restored to their original size and shape, so that the front of this part of the castle is probably in exactly the same state to the eye as in the XIVth century. The way in which this ancient building has been safeguarded could well serve as an example to those who have charge of some similar structures in England. The technical advisers of the Governor of the Isle of Man are Mr. Knowles and Mr. Rigby, both Fellows of the Institute of Architects, and it is intended to make further excavations in the moat and outworks.

Builders' and Contractors' Column.

THE CONSTRUCTION OF A TUBE RAILWAY.—II.

Break-up Chambers.

WHEN the shafts have been sunk, as described in the last article under this heading,* the next operation is to construct a break-up or shield chamber, in which to erect the tunnelling shield, and in order to do this a short heading is driven from the shaft on to the centre line of the proposed tunnel at the point at which the break-up is to be built.

For the purpose of erecting small shields, that is, shields for 11 ft. 8¼ in., 12 ft., or 12 ft. 6 in. tunnels, a break-up 15 ft. or 16 ft. in diameter is constructed 10 ft. long; for the large shields for stations and cross-over tunnels the break-ups are 25 ft. and upwards in size and are 12 ft. long.

The construction of the smaller break-ups is a comparatively simple operation, and is carried out as follows: The miners first excavate a vertical heading about 4 ft. square upwards on the centre line of the tunnel to the top of the proposed break-up, and carefully secure the clay with poling boards, walings, and props; they then gradually widen out each side of this heading until the whole of the upper half of the circular excavation is completed and timbered and trimmed to the size of the rings, allowing a clearance of 2 in. all round. The lower half of the excavation is then proceeded with, but in this very little timber is necessary.

We now have a circular excavation 4 in. greater in diameter than the outside dimensions of the iron rings forming the chamber and 4 ft. long, which gives room for the erection of two 20 in. rings of castings. The nine segments forming each ring are then fixed and bolted up one at a time, care being taken to carefully adjust them to line, level, and shape; when the two first rings are completed they are well grouted. The remaining four rings are then proceeded with one at a time, the excavation for each being commenced from the top and worked downwards, and the clay is strongly timbered as the work proceeds. As the ground is got out for each ring, the iron segments forming it are bolted up and grouted.

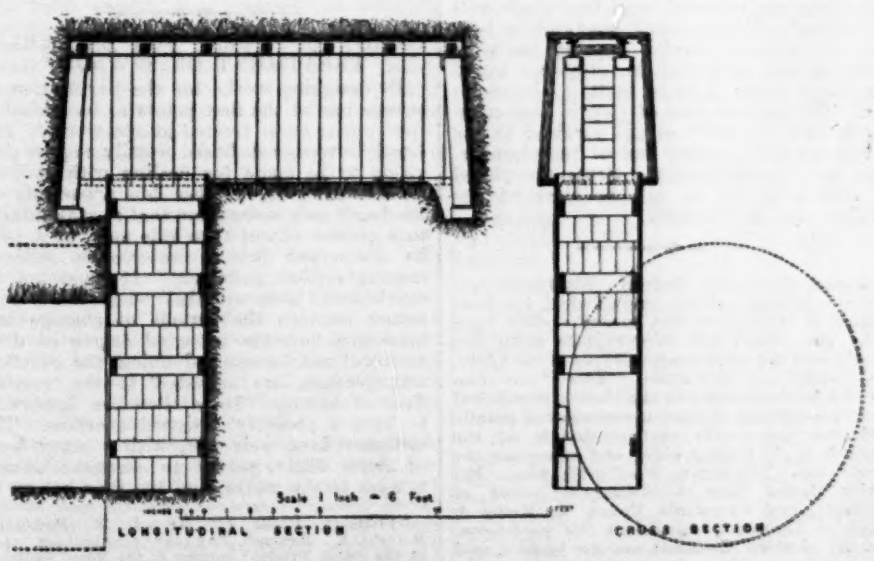
The weight of one ring of castings 16 ft. in diameter and 20 in. long is about 2½ tons.

A break-up is necessary every time it is required to vary the size of the tunnel, as a different shield is required for each size, so that one shield has to be taken down and another erected.

The construction of the large break-up chambers for station tunnels or cross-over roads is a much more serious work, and is, indeed, one of the most difficult operations in this system of tunnel. The following example is taken describing the method employed to construct a chamber 26 ft. in internal diameter and 12 ft. long, in which the shield for the construction of a station tunnel 21 ft. 2½ in. in diameter can be erected.

A vertical box heading or shaft is first driven vertically upwards on the centre line of the proposed break-up chamber. The heading is usually about 4 ft. 6 in. by 4 ft., and is excavated in lengths of about 3 ft. 6 in. One miner only can work at a time in this shaft, and he has to work at the clay above his head all the time. The top 6 ft. of the shaft are taken out at one operation, and the roof is supported on "head trees" carried on "side trees" 6 ft. long, which are in turn supported on foot blocks and wedged tight. From the top of the vertical shaft a horizontal heading is driven forwards for the full length of the break-up, and about 6 ft. high by 4 ft. wide; this also is secured with head and side trees. When the heading is complete two heavy steel joists are got into it and fixed in position under the head trees; these joists form the first two crown bars of the break-up, and are supported on heavy pitch-pine props fixed slightly raking; each of these props is fitted with an iron plate of special design, which prevents the prop being forced forwards by the weight of the ground, and also forms a seating for the end of the joist, thus preventing it from crushing into the prop. The two ends of the heading are timbered with creosoting poling boards supported by the raking props. The crown bars are chogged apart by seven hard wood chogs about 26 in. long. The head trees are next wedged up from the crown bars, so that the whole weight of the roof is transferred from the side trees to the crown bars, and it is then possible to remove the side trees. These are taken down one at a time, and the heading is widened out each side, the roof being supported by creosoted poling boards and the sides of the excavation temporarily timbered. When the heading has been sufficiently widened, two more crown bars are got in and fixed parallel with the first two, and propped and chogged in a similar manner. These operations are repeated until ten bars have been fixed, the boards over each pair of bars being securely grouted as they are fixed. The next operation is to transfer the weight of the roof from the props on to two main cills. Owing to the confined space these cills have to be brought in in two pieces and scarfed together, and are composed of 16 in. pitch pine timbers. The top cills are 23 ft. long, the middle cills 28 ft., and the bottom cills 23 ft. The two top cills are laid at each end of the break-up, 12 ft. 6 in. apart, and at right angles to the crown bars. Each bar is next propped off the cill with a 10 in. pitch pine prop, and wedged up tight with large oak wedges. The cills are strutted apart with four heavy pitch pine cill stretchers, and we then have the top lift of the break-up secure. The second lift is proceeded with as follows: A trench 6 ft. deep is excavated along the centre line of the break-up, extending from back to back of the top cills; two props are put under the cills at each end of the trench, which support the cills and also the face timbering. The trench is then gradually widened out both sides to the full width required, additional props (fixed slightly raking as before) being put vertically under every second prop of the first lift. The second pair of cills, viz., the middle cills, are then brought in and scarfed as before, being placed directly under the top cills. The weight of the top cills is then transferred to the middle cills by vertical props as before described, and the cills are stretched apart. The third lift is excavated and timbered in the same manner. In the case of the bottom lift the clay is trimmed to the shape of the iron lining, the ends of the break-up only being timbered. We now have a strongly timbered chamber 28 ft. 4 in. in diameter in the clear, and 12 ft. 6 in. long in the clear between the cills, in which to erect the cast-iron rings forming the permanent chamber. There are eight rings of iron segments used to make one break-up; the flanges are 12 in. deep, and the weight of one ring is about 8¾ tons, making 70 tons in all.

The segments forming the lower half of all the eight rings are first placed in position,



Headings for the Construction of a Break-up Chamber.

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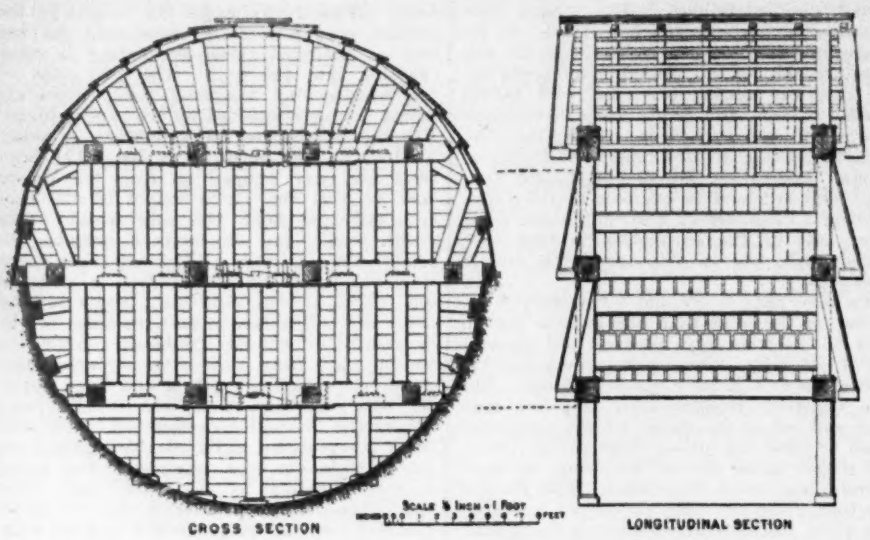
* See our issue for August 4.



Timbering of a Break-up Chamber.

the rings being arranged to break joint one with another for the purpose of additional strength. Each segment is carefully adjusted to its exact position, as it is fixed by means of a trammel sliding on a rod fixed on the horizontal axis of the break-up. When the lower half of the iron lining is complete it is well grouted up, creosoted deal packings being used in the circumferential joints to keep the grout in. Two rings are then carried round and completed, and the space between the outside of the iron and the crown bars and timber is tightly packed with Portland cement concrete, and the whole grouted with cement. The remaining six rings are then completed one at a time, packed with concrete, and grouted.

The segments forming the bottom of the break-up are filled with cement concrete to form a smooth surface, and steel runners are embedded in the concrete to assist in moving the shield when built.

Headwalls.—In order to secure the ground at both ends of the break-up permanently, brick headwalls are constructed, either of blue bricks or flettons in cement. The thickness is 3 ft. 9 in. for a headwall to a large break-up through which only a small tunnel opening is left, and 3 ft. for a headwall through which a station tunnel opening is left. The headwalls are constructed as follows: The bottom cills are strutted with raking struts to the iron lining, so that the vertical struts carrying the cills can be removed leaving the face of the clay exposed up to the cill. The clay is excavated by undercutting to the thickness required for the brickwork, which is immediately proceeded with up to the cill. Pipes are built into the brickwork for the purpose of grouting it when finished. The middle cills are next strutted with raking struts, the vertical struts are removed, and the excavation and brickwork proceeded with as before. These operations are repeated until the whole wall is finished. The forward headwall is constructed with a circular opening in it of sufficient size to give 2 in. clearance round the shield which is to be built in the chamber. The exposed face of clay in this opening is strongly timbered and strutted to the brickwork at the other end of the chamber, care being taken that the struts are placed in such positions as will be clear of the shield when it is erected.

ROMAN CATHOLIC CHURCH, WELLINGTON.—The new Roman Catholic church which has been erected in Wellington was opened a short time ago. The church will accommodate about 350 people, and the whole work will cost about 4,500*l*. The walls are of stone. There are two arcades in the interior of the church (north and south), consisting of alternate columns of granite and red stone. The centre window of the chancel is of stained glass, and represents the Crucifixion. The screen is of pitch pine. Mr. Myles Morley (late of Wellington) acted as architect, and afterwards Messrs. E. Kirby & Sons, of Liverpool, supervised the operations. Mr. W. Skellorn (Stafford) was the builder, and Mr. J. Mahoney (Shrewsbury) the clerk of works.

FACTORY FIRES.

MR. JOHN BURNS has caused a code of model by-laws to be drawn up with the view of enforcing the provision of adequate means of escape from fire in small factories and workshops.

Sect. 15 of the Factories and Workshops Act of 1901 empowers every district council to make such by-laws, and provides that these by-laws must be confirmed by the Local Government Board. In regard to factories in which more than forty persons are employed, special regulations are laid down by sect. 14 of the Act, but in order to encourage the making of such by-laws with regard to smaller factories the series recently issued by the Local Government Board applies only to factories not coming within that section. The more important provisions of the new model by-laws are:—

1. Any factory containing more than one story shall be provided with adequate steps and stairs affording direct and unimpeded access to the ground floor of the premises, and, where possible, such steps and stairs shall be fixed outside the building.

2. Every such building, any floor of which is more than 30 ft. above the ground, and in which more than ten persons are employed, or where inflammable materials are stored, shall be provided with (*a*) an external staircase of fire-resisting material, or (*b*) a fire-escape, or (*c*) a ready means of access to the roof of such building or an adjoining building.

3. At least one window in each room of such factories shall be constructed so as to open easily at the level of the sill, and shall be distinctly marked.

The penalty imposed for the non-observance of the by-laws is 5*l*. for the first offence, and a daily penalty of 2*l*. for each day after written notice of the offence from the district council.—*Tribune.*

DESIGN OF WORKS FOR BACTERIAL TREATMENT OF SEWAGE.*

IN designing works for the purification of sewage one of the first points to be settled is the volume to be treated at the works. The Local Government Board usually require provision to be made for dealing with at least six times the dry-weather flow apparently on the fairly safe assumption that sewage diluted to a greater extent than this may, as a rule, be discharged into a watercourse without causing serious pollution. It must not be overlooked, however, that when heavy rain occurs between the periods of average and maximum flow the intended degree of dilution will not be reached unless the overflow arrangements are adjusted to the varying flow of sewage. It is therefore important to have a properly designed overflow. The ordinary fixed weir will, with a heavy head of storm water, permit an excessive volume to pass to the works, and the type known as the "leap-weir" is also unsatisfactory. A type of storm-water overflow not generally known, but far in advance of the usual forms adopted, is one having a separating plate fixed horizontally at weir level across the sewer. The quantity to be treated passes underneath this plate, and all in excess is deflected by a vertical plate into the overflow culvert. A description and illustration of this is given in a paper recently read before the Institution of Civil Engineers by Mr. D. E. Lloyd Davies, Assoc.M.Inst.C.E. But no storm-water overflow which does not take into account the fluctuating dry-weather flow of sewage can be considered entirely satisfactory. The overflow should be capable of adjusting itself to the varying flow in the sewer, so that it would always come into operation when the proper degree of dilution was reached. Not infrequently paper and other floating matter pass over the storm-overflow weir, and some means should be adopted for preventing such objectionable matter from entering the watercourse.

The works of purification may be conveniently described under the following heads:—Screens, detritus tanks, sedimentation or septic tanks, filters, and land. . . .

It is necessary that the sewage should be screened upon entering the works. The design of the screens will depend somewhat upon the character of the sewage and its subsequent treatment. Except in very small works, it is desirable to have the screen in duplicate, so that the sewage may occasionally be diverted from one in order to thoroughly clean it. As a rule, screens having inclined bars placed ¾ in. apart will be sufficient. Screens having mechanical rakes may sometimes be adopted in the larger works with advantage, particularly where the outfall sewer is deep, and wide fixed screens would involve a costly chamber, or where motive power is available. Revolving screens may also be found useful in some cases, especially where a head of sewage can be utilised for driving them. But simple hand-raked screens should be provided wherever they can be conveniently applied. Considering the importance of keeping a free discharge of sewage and the desirability of minimising the labour in raking, it is surprising to find screens in many cases only from twice to three times the width of the outfall sewer, especially as screens of adequate width and area can always be provided at comparatively trifling cost. The author suggests that where shallow screens to be raked by hand are provided, the total width should not be less than 9 in. per 1,000 population dealt with, with a minimum of, say, 5 ft. Thus for the discharge from a population of 20,000 the total width would be 15 ft., and for a population of 60,000, 45 ft.

All road detritus and other mineral matter should, as far as practicable, be intercepted in properly designed tanks. . . . The interception of organic matter in suspension along with the detritus is a decided disadvantage, as this can be better dealt with at a later stage of the treatment. Moreover, it renders the removal of the detritus an offensive operation. To bring about the separation, the sewage in its passage through the tanks should be slightly agitated. It has been found in practice that with a flow of about a million gallons per day it is quite possible to agitate the sewage sufficiently with hand rakes to effect this separation, but it would be preferable to rely upon some mechanical means of agitation where possible. . . .

Having freed the sewage of the greater part of the mineral matter, some form of tank treatment is necessary prior to its application to filter beds. The opinion once freely expressed that the introduction of the septic tank would practically solve the problem of the disposal of sludge is now fully recognised as being erroneous, and a closer acquaintance with the tank has shown that its merits have been somewhat exaggerated. It cannot be denied that a considerable quantity of sludge is liquefied by the use of the septic tank, and its disposal is thus somewhat simplified. The one serious objection to the septic treatment of sewage is the offensive smell which is necessarily produced by a process depending for its success upon the fermentation or putrefaction of the sewage. This objection applies especially to the use of open septic tanks, the treatment in which

*From a Paper by Mr. J. S. Pickering, M.Inst.C.E., Borough Engineer, Cheltenham, read at the recent Bristol Congress of the Royal Sanitary Institute.

cannot possibly be carried on continuously without a nuisance. The author has visited numerous installations where open septic tanks are adopted, and in no single instance has he found works free from the objectionable odour due to the septic treatment.

It is generally recognised that the expense of covering in large tanks is not justified by the slightly increased liquefaction of the solids obtained, and this is no doubt the reason why the tanks are left open. But the author is of opinion that if septic treatment is to be carried out with the least possible offence the tanks should be covered and thoroughly ventilated, preferably by mechanical means. . . .

Before determining the size of the tanks it is necessary to decide to what extent they will be required to act as septic tanks. It may be taken roughly that tanks of a sufficient capacity to contain a day's dry-weather flow will liquefy about 50 per cent. of the organic solids, and it is questionable whether by doubling, or even trebling, their capacity a further 25 per cent. will be liquefied. On these grounds the expense of the additional capacity would not be justified by the comparatively small advantage in the results. Indeed, in the author's opinion, it is questionable whether it is either necessary or desirable for sewage to undergo a special septic treatment prior to its application to bacteria beds. Possibly some slight septic action in the tanks may be helpful in the subsequent treatment, but the practice of allowing the sewage to putrify to such an extent as to cause the surrounding atmosphere to be grossly polluted, whatever may be the advantages of such a treatment as regards liquefaction and preparation for the filter beds, is highly objectionable from a sanitary and æsthetic point of view.

Provided suitable arrangements are made for removing some of the deposited sludge at frequent intervals, tanks of a capacity of three-fourths the dry-weather flow should be of ample size to effect the clarification and give any necessary septic action to the sewage, and probably in most cases a much smaller tank capacity would be sufficient.

The means for the removal of sludge from sedimentation or septic tanks call for careful consideration in the design of the tanks. It is now practically agreed that it is necessary to remove sludge from the tanks at shorter or longer intervals. . . . In a scheme about to be carried out by the author, it is proposed to build a cross wall 18 ft. from the inlet end of each tank, and to fix in each of the rectangular spaces so provided two helical scrapers (actuated from a spindle passing through the roof), which will traverse practically the whole area of the floors and convey the sludge to an outlet placed immediately under each spindle, whence it will gravitate through a discharge pipe. It is hoped that, by intercepting the bulk of the sludge in these chambers, and removing it from time to time, it may not be necessary to empty the whole contents of the tanks more than two or three times each year.

Before leaving the consideration of septic tanks, mention may here be made of Mr. Dibdin's experiments in substituting slate beds for the usual preliminary tank treatment. By this method of ærobic bacterial treatment, immunity from nuisance is claimed, and if its satisfactory application on a large scale can be demonstrated—which is somewhat doubtful—a decided advance in the sewage problem will have been made.

The question as to whether the tank effluent should be dealt with in contact beds or continuous filters depends largely upon the levels of the site and other local conditions. Broadly speaking, the effluent from a percolation filter 6 ft. deep is equal in its standard of purification to an effluent of the same quality sewage from a double contact system.

The practice of the Local Government Board is to require the same capacity to be provided for percolation filters as for single contact beds, and if a second contact is provided, at least half as much again, and possibly twice as much, filtering material is required. When the system was first introduced, eminent authorities on the subject expressed the opinion that contact beds after being in use a comparatively brief space of time would acquire a practically constant capacity. Experience has not confirmed this sanguine view, and it is now generally recognised that the material must be sifted or washed from time to time to restore the liquid capacity.

The life of a percolation filter is undoubtedly much longer than that of a contact bed. Percolation beds which have been in use for several years show no reduction in treating capacity. They are in a measure self-cleansing. The substance which clogs the interstices of a contact bed either passes through a percolation bed with the effluent or may be readily washed through. A system of percolation filters will be, as a rule, much more economical, both in initial outlay and working expenses, than a system of double-contact beds.

Nothing need be said on the design and management of contact beds, as their construction and method of working are comparatively simple; points decidedly in their favour as compared with continuous filters. There are many matters requiring consideration in designing percolation filters, and details of construction are still the subject of controversy.

Although it is customary to build the filters with perforated walls above ground-level, it has not been demonstrated in practice that this method of construction produces better results than in the case of filters having closed walls or merely earth embankments.

The permanent success of a filter depends largely upon the use of a suitable filtering medium, and too much care cannot be exercised in making a selection. Materials liable to disintegration, such as coke, ashes, and burnt ballast, should be avoided. Blast furnace slag requires experience in its selection. It has been found satisfactory in most cases, but in some instances it has not been a success. Hard furnace clinker is generally looked upon as one of the most suitable materials, and, provided it can be obtained of a sufficiently durable character, will no doubt be found satisfactory. Remarkably good results have been obtained by the use of hard coal. Coarse gravel, although generally durable, does not produce so good an effluent as most other material broken to the same size. Fine gravel, however, gives much better results. The author is of opinion that a very hard angular material, such as broken granite, will prove the most advantageous for use, notwithstanding that its initial cost may be somewhat high. It should be remembered that repayment of the loan for the material usually extends to thirty years, and any replacement during this period must be paid for out of revenue; hence the desirability of providing a material likely to last during the period of the loan.

The size of material for the beds is a matter on which a great difference of opinion still exists. Examples may be given of two of the largest installations in the country. In one case the filtering material has been carefully sieved and graded to sizes varying from $\frac{1}{8}$ in. to 1 in., and in the other any size between 1½ in. and 6 in. has been used. The probability is that the finer filter will give the greater degree of purification, but there is a tendency to ponding on the surface with so fine a material, and it is questionable whether it will be found entirely satisfactory in practice. The nature of the material must to some extent be considered in deciding upon the size to adopt. For instance, a material not liable to disintegration may be used much finer than one of a friable character. There is unfortunately very little information available on the relative results of various-sized materials, and until this is forthcoming it is difficult to arrive at a satisfactory conclusion.

Several methods have been adopted for distributing the sewage over the filters, but the two most important need only be mentioned, viz., fixed sprinklers and rotary distributors, the others being modifications of these. The system of spraying through fixed jets of suitable design gives perhaps the most even distribution, and consequently the best results, but it is open to the serious objection that it cannot be carried out without great nuisance, particularly where the sewage sprayed is from a septic tank.

Rotary distributors are less objectionable in this respect. They have been much improved of late, and from the several different types now manufactured there should be no difficulty in selecting one which with ordinary attention will be fairly reliable. It is not advisable to adopt rotary distributors for beds much over 100 ft. in diameter unless electric motors or other motive power is provided.

Dosing tanks become a necessity where the flow of sewage is both small and irregular, but it is questionable whether the additional expense of mechanical arrangements is justifiable, on the grounds that by applying the sewage intermittently better effluents will result.

A considerable quantity of suspended matter is generally contained in the effluent from percolation filters, and where there is no land treatment following it is somewhat difficult to deal with. It is of so light a character that it cannot be readily precipitated in catchpits, and the best method of dealing with it is to pass the effluent through a shallow filter composed of sand or other suitable material. A coating of what appears like a rich soil will be formed on the filter, and this can be easily skimmed off.

The usual streaming filters for the treatment of storm-water at the rate of 500 gals. per cubic yard per day do not effect any great degree of purification, and it is preferable to deal with storm-water on land, where available.

Great hopes were at one time entertained that the Royal Commission appointed eight years ago to deal with the subject of sewage purification would bring forward a final and satisfactory solution, but so far it has not been forthcoming, though some useful information may be obtained from the various reports issued. What appears to be required is a properly-organised State Department, which would collect reliable information from works in operation and conduct trials and experiments at the expense of the nation for the guidance of sanitary authorities, who are now left to their own resources to find a solution of the sewage problem.

THE CONSTRUCTION AND MAINTENANCE OF RURAL ROADS.*

EXPERIENCE has shown that a metalled surface of 18 ft. is required for rural roads (main), and a width of 40 ft. between the fences, and in the neighbourhood of large towns these dimensions should be increased to 30 ft. and 60 ft. respectively. The law allows vehicles 9 ft. in width to travel the highways.

The construction of the road will depend on the material available in the neighbourhood. If hard clinkers or refuse from a destructor is to be used, this will require to be 12 in. in depth, and to be well rolled before the broken top metal is applied. The road bed would be 20 in. below the finished surface of the road, and should be curved to give a fall of 6 in. to 9 in. from the centre to the sides. Where possible, the finished road surface should be kept above the level of the adjoining land.

If any bog, springs, or running sand is found below the road bed, it should be excavated, and 12 in. of clay puddle placed over it. If a troublesome yellow clay, that is sometimes found between the coal measures and the limestone, it should be trenched across every 3 yds., 2 ft. deep, and the trenches filled with ashes.

Where the road is in cutting there should be at least a yard of levelled surface between the metalled surface and the toe of the slope. The top metal should be of hard broken stone, not more than 2½ in. in its longest diagonal dimension, spread from the shovel to give an even surface of about 1 in 30 from the centre 4 in. thick. This will require one ton to every 8 yards superficial, and when consolidated the top metal will be 3 in. in thickness. In all cases of thick coating, use a profile mould to obtain a good cross section.

Macadam's Mode of Construction.

Briefly, it is this, 12 in. of broken stone, the largest stone 6oz. in weight. No blindage, the road bed to have a curvature of only 3 in. Macadam, following Edgeworth and others, advocated no bottoming, the material to be of the same quality throughout.

His theory that the stones would bind by the interlocking and intersection of their own angles is a very pretty theory, but I am

*Part of a paper by Mr. Robert Phillips, A.M.Inst.C.E., County Surveyor, Gloucestershire, read before the recent Royal Sanitary Institute Congress at Bristol.

afraid when the stones had to be rolled in by the cart wheels the binding material was supplied by abrasion during the process of consolidation. The modern construction of macadam roads is cheaper, but not so good. The bottom 8 in. is of an inferior metal; crop stone from limestone quarries, pennant spauls, slag, any inferior stone is carted and tipped on the road, and broken down with a sledge hammer, and some gravel or ashes spread to fill the interstices. On this is spread 4 in. of the hard top road metal; this is watered, blinded, and steam rolled. There is another variation of macadam plan, known as machine crusher road stone roads. This is to construct the road in three thicknesses, the lower layer to be 6 in. thick of machine broken stone, no stone to be more than 3 in. or less than ½ in., this layer to be watered and steam rolled till consolidated like a finished road; the material for this bottom layer may be inferior limestone. On this a second layer 3 in. thick, no stone in this to exceed 1½ in. or less than ½ in., and consolidated as before. The third layer to be 2 in. thick, no stone to be more than 1 in. or less than ½ in. in size. The whole to be watered and consolidated with a steam roller.

Telford's Mode of Construction.

The following is a copy of his specification:—

"The metalling is to consist of two beds, or layers—that is to say, a bottom course of stones, each 7 in. in depth, to be carefully set by the hand with broadest end downwards, all cross-bonded or jointed, and no stone to be more than 3 in. wide on the top. These stones may be of good whinstone, limestone, or hard freestone, the vacuities between the said stone to be carefully filled up with smaller stones, packed by hand, so as to bring the whole to an even and firm surface.

The top course or bed is to be 7 in. in depth, to consist of properly broken stones, none to exceed 6 oz. in weight, and each to pass through a circular ring 2½ in. in diameter in their largest dimensions. These stones to be of hard whinstone, the quality of both bottom and top metal to be determined by the inspector. In every 100 yds. in length on each side of the road, upon an average, there is to be a small drain from the bed of the bottom layer to the outside ditch, as shall be directed by the inspector.

Over the upper bed or course of metal there is to be a binding of gravel, of 1 in. in thickness on an average. In the cross section of the finished roadway there is to be a curvature of 6 in. in the middle 18 ft., and from that on each side a declivity, at the rate of ½ in. in 1 ft., to within 18 in. of the fences. In the remaining space of 18 in. there is to be a curvature of 3 in., making in all about 9 in on each side below the finished roadway."

The advantages of this system are that, though you want skilled workmen to pitch the bottom, you can use a material that you could not use in the other system for the bottom—even sand-stone, that is unsuitable for road metal—and if the stones are securely wedged with spauls, they will not work up through the top metal. The writer has used this mode of construction with a 6 in. bottoming and 4 in. of 2½ in. broken basalt, rolled and consolidated to 3 in., making a total of 9 in., on roads carrying heavy traffic. If properly done, this is by far the quickest way of making a road, and is less costly in repairs for the first few months after construction.

Drainage.

This is a fresh problem on every chain of road; the contour of the country, the position of streams or ditches for the outfall, must be considered. The use of pipes has become general, but the old square road drains with cever stones and open ditches are preferable, as they are easily repaired by the roadmen.

Side Channels.—No road should be left without a water-table and a raised margin at the side from 4 in. to 6 in. high. This can be formed in rural districts by turf in two thicknesses, the bottom one grass down, the top one grass upwards.

Mode of Maintenance.

Many roads are simply worn tracks that have been covered with macadam, and average a total thickness of about 5½ in. of macadam, often on a clay sub-soil that works through and changes with the weather. The writer's practice is to have the road scraped or swept clean before applying the fresh metal, the new material to be of the hardest attainable, and to be broken by hand (on the roadside where possible), to a 2½ in. ring. Occasionally a 2 in. stone is used, the new metal to be kept as clean as possible, and spread one stone thick, one ton to cover 12 superficial yards; this to be dry steam rolled without any blindage till the stones are fixed, and then the smallest possible quantity of blindage. The writer stores the road scrapings for this purpose in heaps till vegetation has decayed. Surveyors differ in opinion; some use 10 per cent. of the screenings from the machine as blindage. The writer has tried these, but prefers the road scrapings.

A slurry must be made to fix the top stones, and even with a sticky slurry the hammering of the horses' hoofs causes some stones to work loose, and the roller should be kept in the neighbourhood to dry roll this after a few days.

With a properly constructed road, longitudinal machine scarifying before laying the stone is economical of material, but hand scarifying by picks across the road is very destructive to the road and wasteful. The writer maintains over 1,000 miles of road, and does not scarify any; if the road is hard it is well watered before the stone is spread.

The writer uses 15-ton rollers and two-wheeled water-carts, and a pump, independent of the water-cart, capable of filling the water-cart in ten minutes. Water should not be stinted, though sometimes the distance to be hauled may be six miles. The rollers consolidate about 30 tons of basalt or granite or 40 tons of limestone per day. The difference in pressure per square inch of roller surface between a 10-ton and a 15-ton steam roller is only about 35lb. per square inch. The drainage of the road should be attended to, grips, ditches, and water-tables cleaned, and the sides of water-tables cut yearly.

The use of mechanical traction, and motor cars with rubber tyres, and the army of bicyclists, have increased the cares of those having charge of the main roads. More attention must be devoted to the surface of the road; 1 in. to 1¼ in. chippings must be kept on the roadside to patch holes or depressions. These holes are mostly the result of incompetent men spreading; a good spreader of road stone is invaluable. Motor cars have part of their machinery slung below the body of the car; the pneumatic tyres suck the small grit from the road surface, and the parts below the car blow it up in the air.

The prevention of dust is a difficult problem. At several periods in the history of roads tar has been used to assist in binding the road material, and from various causes has been abandoned. That in urban districts it will save the heavy cost of watering is proved. In rural districts where there is no watering (the writer maintains 1000 miles of road and does not water one mile) the cost to a county council is prohibitory; to tar the main roads of Gloucestershire would cost £50,000 per annum, about £50 per mile. The dust is not all caused by the material of the roads. The solution appears to be the use of the hardest and heaviest stone procurable, to use as little blindage as possible, and perhaps to grout it with pitch and tar before applying any blindage, after it has been dry rolled. Limestone and all the softer stones that make mud in winter and dust in summer will cease to be used; the problem of the prevention of dust is too serious a matter.

SEWAGE PURIFICATION WORKS, AND THE HEALTH OF THE COMMUNITY.*

THE effect sewage has upon the health of the community can be better understood if I describe the origin and composition of sewage. We know that we have to be supplied with an abundance of pure water; in fact, our very sustenance depends upon this precious liquid, the purity of which has to be above suspicion when delivered to us, and entirely free from solids in suspension. But after supporting life, cleansing the inhabitants, cleaning utensils and materials, supporting and moving industrial operations, it arrives for treatment at the outfall to the sewage purification works. What is known as a domestic sewage contains anywhere from 60 to 100 grs. per gallon of solids in suspension and solution—organic and inorganic. It is these matters which have to be removed at the sewage purification works.

Now, sewage or water weighs 70,000 grs. to the gallon, and an average sewage contains from 80 to 100 grs. of solids per gallon, the remaining 69,900 grs. being water. But the sewage of a manufacturing town, owing to the amount of trade waste liquors poured into the sewers, contains anywhere from 100 to 150 grs. per gallon of solid matter. These 150 grs. seem, no doubt, to many to be infinitesimal in 69,850 grs. of water, and it certainly is a very small proportion; but when I say that 15 grs. per gallon represent 1 ton per 1,000,000 gallons, you will gather what even this seemingly small amount means.

These 150 grs., however, contain about 75 per cent. of organic putrescible matter, and it is this putrefying matter, both in suspension and solution, which the sewage purification works have to remove at the present day. The bulk of these—namely, those in suspension—are first removed by precipitation or sedimentation, chemically assisted or otherwise; the remaining portions—namely, those in solution, but also some in suspension, the latter being in a very finely-divided state which have escaped the first process—are removed by filtration, or what is technically known as oxidation. Such, then, is sewage, but without discussing any principle of treatment we will ask ourselves why have we to purify this liquid refuse of human habitations, and what is its effect upon the health of man? We are citizens of the realm, and therefore, as citizens, must abide by and fulfil the law of the land; and we must remember that the laws are made by the people (ourselves), and the Public Health Act of 1875 says:—That before discharging any liquid refuse into a stream or river the local authority must use the best practicable, reasonably available, means in their power for purifying such refuse before discharging same into a river or streams.

In going through our everyday life we often hear the remark:—Is there anything new under the sun? We are told in ancient history that the following rule or custom was strictly observed, and an exceedingly strict penalty was imposed on those persons found disobeying the same—*i.e.*, "Neither make water, nor spit, nor wash your hands in a river, nor defile a stream with urine"—extreme veneration being paid to all rivers. Now, will all our up-to-date sanitation, what would we say to-day if such a stringent Act of bygone ages was in force?

Our first stage in sanitary progress, which includes sewage disposal, seems to have commenced with the Poor Law Commissioners of 1839-42, who found that the diseases prevailing among the working classes were those due to accumulations of decomposing refuse, damp, close, and overcrowded dwellings, and improper water supply. These commissioners first recommended the construction of sewers, by which means the liquid filth of towns could be transported a distance, and then be applied to the land, in order to prevent the pollution of rivers. But the slow progress made with these recommendations led Parliament, early in 1848, to pass the following resolutions:—"That further and more effectual provision ought to be made for improving the sanitary condition of towns and populous places, and the sewerage, drainage, cleansing, and paving thereof should, as far as practicable, be placed under one and the same local management and control, subject to general supervision." This resolution was immediately strengthened by the passing of the Public Health Act of 1848. After the passing of this Act the larger towns carried out sewerage or drainage schemes with greater vigour, discharging such drainage into the nearest river or stream, in face of the fact that the Poor Law Commissioners advised its discharge on to land; therefore, the second state of the rivers became worse than the first, owing to the sewage now being discharged at certain points into the river in bulk, instead of finding its way down this zigzag ditch or the other various points as heretofore and being partly purified on its way. That the country has suffered from such pollution has been evident by the various outbreaks of typhoid epidemics and other diseases from time to time. In 1857 a Royal Commission was appointed to inquire as to the best mode of distributing the sewage of towns; and in 1865, after considering the question for eight years, reported as follows:—"That the right way to dispose of town sewage is to apply it continuously to land, and it is only by such application that the pollution of rivers can be avoided."

* Part of a paper by Mr. J. Ashton, F.C.S., M.R.San.I., read at the Manchester meeting in July of the Institute of Sanitary Engineers.

It was after the finding of this commission that our first sewage farms in England were made, and I may point out that the farms then laid out are still working as sewage farms.

However, it appears that something was still wanting, for another Royal Commission on Sewage Disposal was appointed in 1868—this time to inquire into the best means of preventing the pollution of rivers. This commission made various reports, the last being in 1874, and concluding as follows:—"For removing organic matters, intermittent filtration through land, and irrigation over land, are greatly superior to upward filtration (artificial) and chemical processes." It is therefore not very difficult to understand why the Local Government Board have always insisted that any local authority seeking borrowing powers for the construction of sewage purification works should provide for the application of the sewage or effluent to a suitable area of land before discharging the same into a river or stream.

The Rivers Pollution Prevention Act of 1876 was the result of the sitting of the above commission, which, to a certain extent, consolidated matters, and says that:—"Every person who causes to fall or flow, or knowingly permits to fall or flow or to be carried into any stream, any poisonous, noxious, or polluting liquid proceeding from any factory or manufacturing process, shall be deemed to have committed an offence against this Act."

Now, the Public Health Acts of 1875 and 1876 give to local sanitary authorities power to prosecute offenders against this Pollution Act. But how could they, the local authority, enforce this Act when they were probably the greatest offenders by discharging unpurified sewage direct to the river? Consequently, no legislative measures were taken. However, to make this Act effective, the Local Government Act of 1888 (sect. 14) constituted county councils sanitary authorities, which gave to them the power, in addition to any other authority, to enforce the provisions of the Rivers Pollution Prevention Act in relation to so much of any river or stream as is situate within, or passes through or by, any part of their county.

The Lancashire County Council, therefore, lost no time in forming two committees, one for each watershed—namely, the Ribble and the Mersey. These committees appointed their officers about the year 1890, and commenced operations forthwith. In this Act, then, we find the first earnest attempt to cope with river pollution since it was first considered by the Poor Law Commissioners in 1839.

After these joint boards were formed by the county council, sixteen years ago, a large amount of work has been done in the way of preventing pollution of the rivers, as is shown by the last report of the Chief Inspector to the Mersey and Irwell Board—Mr. R. A. Tatton, Assoc.M.Inst.C.E.

In this board's area, which includes that portion of Lancashire, Cheshire, and Derbyshire which falls to the Mersey, the report says:—"There are seven county boroughs, fourteen non-county boroughs, sixty-three urban district councils, and eleven rural district councils, totalling ninety-five authorities."

The following table shows the progress made with sewage purification works since 1892:—

—	May, 1892.	May, 1904.	Rural authorities, May, 1904.
Authorities with works in operation	27	80	10
Works being constructed	8	0	0
Schemes sanctioned	2	0	3
Schemes submitted to Local Government Board	6	1	0
Schemes under consideration	7	1	0
No schemes	26	2	1

By this we see there were ninety schemes at work in 1904, as against twenty-seven in 1892, or ninety authorities out of the ninety-five.

Speaking of pollution at the present time in his last annual report, Mr. Tatton goes on to say:—"The most serious pollution at the present time is from storm water, as anyone who will inspect one of our rivers after a thunderstorm following a period of drought can verify, and most of the large boroughs are terrible sinners in this respect; the question of dealing with storm water is one which requires their most serious attention."

Now, returning to the Local Government Board for a short time and the methods of treatment—although there are, and have been for some years, many artificial methods of purifying sewage in a satisfactory manner, the Local Government Board still adhere to their iron rule (and they could not do otherwise from the finding of the before-mentioned commission) by insisting that local authorities should provide a suitable area of land for final purification, but there was so much objection to this rule by local authorities a few years ago (when what is known as the bacterial treatment was born) that another Royal Commission on Sewage Disposal was appointed in 1898. Their appointment was:—"To inquire and report what methods of treating and disposing of sewage (including any liquid from any factory or manufacturing process) may properly be adopted."

This commission has now been sitting eight years—and are likely to continue—but they issued a fourth report in 1904, which report deals fully with land treatment, and concludes, like the other commissions before them:—"That land is the best medium for the purification of sewage," with the proviso, if it is of suitable character.

But they also find (what other commissions have not done):—"That artificial processes are capable of effectually purifying sewage according to ordinary chemical standards, so as to be dischargeable into a stream without fear of creating a nuisance." This latter is from their interim report of 1901; and since then local authorities have been able to obtain borrowing powers for sewage disposal works (artificial processes) provided they could show that (1) the land available is unsuitable in quality, or (2) that the area available is inadequate, or (3) that it is prohibitive in cost.

So we see that local authorities have benefited by the sitting of the present commission to a very great extent. We have now seen the progress made, briefly, with the various Acts of Parliament relating to sewage purification and river pollution, owing to the advance of sanitary science in this country, and that we are forced by law to carry out these sewage purification schemes for the benefit of the health of the community. So much so that, if a local authority is found wanting in this respect, and if brought before the court by the proper authority, a penalty not exceeding 5*l*. per day is imposed until such pollution ceases.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on July 30 dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Fulham.—A projecting porch in front of No. 10, Lettice-street, Fulham (Messrs. Lowndes & Drury).—Consent.

Hampstead.—Wood and tile porches to four houses on the west side of Finchley-road, Hampstead, between Ardwick-gardens and Burgess-hill, and to two houses on the south east side of Burgess-hill (Mr. J. D. Hunter for Mr. R. V. Hart).—Consent.

Kensington, North.—A projecting shop front to No. 134, High-street, Notting-hill-gate, Kensington (Messrs. C. Spreckley & Co. for Mr. A. Lober).—Consent.

Kensington, South.—Retention of an addition at the rear of No. 8, Colcherne-road, West Brompton, abutting upon Wharfedale-street (Mr. A. G. Harfield for Mr. G. F. Webb).—Consent.

Lewisham.—A porch in front of a house on the southern side of Oakcroft-road, Lewisham (Mr. E. W. Leeson for Mr. A. B. Bacon).—Consent.

Marylebone, East.—Buildings with shops on the site of Nos. 188 to 198A (even numbers only) inclusive, Great Portland-street, St. Marylebone, so far as regards the frontage of such buildings to Great Portland-street (Mr. D. Brown for Messrs. R. Mickel & Co.).—Consent.

Norwood.—Porches and oriel windows and the fixing of sham half-timber work to fifty-eight houses in Trinity-road, Herne-hill, and to fifty-seven houses in a new street to lead from Trinity-road to Norwood-road (Mr. C. M. Quilter for Mr. T. L. Searon).—Consent.

Paddington, North.—Temporary buildings on the northern side of Harrow-road, between Ranelagh-road and Westbury-road (Mr. T. J. Bailey for the Education Committee of the Council).—Consent.

Peckham.—Re-erection of the "Duke of Sussex" public-house, abutting upon Commercial-road and Lower-park-road, Peckham, and the erection of four houses adjoining such public-house to the northward in Lower-park-road (Messrs. Hubbard & Moore for Messrs. Barclay, Perkins & Co., Ltd.).—Consent.

Peckham.—Two houses with shops on the north side of Evelina-road, Nunhead, on a site between Kirkwood-road and Grimwade-crescent (for Mr. N. Pellew).—Consent.

St. George, Hanover-square.—A deviation from the plans approved for the erection of a building on the site of Berkeley Chapel, on the north side of Charles-street at the corner of John-street, Mayfair, with an irregular open space at rear and projecting porches, balcony, and an angle turret, so far as relates to the filling in with glass of the sides of the porch in front of the portion of such building known as No. 19B, Charles-street (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

St. George, Hanover-square.—A bay window and a hood to the doorway at the proposed new Guardians' offices, Prince's-row, Buckingham Palace-road (Mr. F. J. Smith for the Guardians of the parish of St. George, Hanover-square).—Consent.

St. Pancras, South.—A projecting iron and glass portico and shelter to the proposed "Hotel Gwalia," on the site of Nos. 11A and 11B, Upper Woburn-place, St. Pancras (Mr. A. Swash for Mr. J. M. Jenkins).—Consent.

Wandsworth.—One-story shops on part of the forecourts of Nos. 291 to 301 (odd numbers only) inclusive, Cavendish-road, Balham (Mr. J. H. Beare).—Consent.

Camberwell, North.—A one-story building in front of No. 101, New Church-road, Camberwell (Mr. J. Richards for Messrs. Trier Brothers).—Refused.

Hammersmith.—Shops and flats on a site of the eastern side of Askew-road, Hammersmith, to the northward of No. 264, Goldhawk-road (Mr. M. de H. Duval).—Refused.

Strand.—Retention of an illuminated advertisement sign in front of the Palace Theatre, Cambridge-circus, Charing-cross-road (Mr. A. Butt).—Refused.

Wandsworth.—Permission to retain a building on the south-west side of Moyser-road, to abut upon the north-west side of Ribblesdale-road (Mr. H. R. Thorp).—Refused.

Wandsworth.—Nineteen houses on the north-east side of Moyser-road, Streatham, with flanks to abut upon Pendle-road, Ribblesdale-road, and Nimrod-road (Mr. F. Loveday).—Refused.

Width of Way and Lines of Frontage.

Southwark, West.—Erection at the "Duke of Wurtemburg" public-house of a urinal and the retention of a brick wall at less than the prescribed distance from the centre of Brunswick-place, Hatfield-street, Southwark (Mr. H. W. Budd for Mr. J. Bartlett).—Consent.

Camberwell, North.—A one-story building on the western side of Sugden-street, Camberwell, to abut also upon Depot-street, at less than the prescribed distance from the centres of the roadways of the said streets (Mr. A. E. Biggs for Mr. S. Lamb).—Refused.

Lewisham.—Buildings on the northern side of Sangley-lane, Catford, abutting upon Plassey-road (Messrs. Wilson & Wilkinson for Mr. T. Buckland).—Refused.

Peckham.—A four-story building on the site of Nos. 761 and 763, Old Kent-road, Peckham (Messrs. W. Cooper).—Refused.

St. Pancras, West.—An oriel window and iron jib at No. 6, Stanhope-street, St. Pancras (Mr. J. Webster for Miss C. C. Ayres).—Refused.

Width of Way, Frontage, and Space at Rear.

Lewisham.—Twelve houses on the western side of Hither-green-lane, Lewisham, between Brownhill-road and Sandhurst-road, with irregular open spaces at the rear and porches, half-timber work, and barge boards in front of such buildings (Mr. H. L. Upham for Messrs. A. Wood & Son).—Consent.

St. Pancras, South.—A building on the site of Nos. 11A and 11B, Upper Woburn-place, St. Pancras, at less than the prescribed distance from the centre of Woburn-buildings (Mr. A. Swash for Mr. J. M. Jenkins).—Consent.

Width of Way and Construction.

Poplar.—A deviation from the plans approved for the erection of two temporary iron sheds on the south-east side of Deptford-ferry-road, Millwall, near its junction with West-ferry-road, so far as relates to the erection of two iron additions to one of such sheds (The Guelph Patent Cask Company, Ltd.).—Consent.

Lines of Frontage and Construction.

Hammersmith.—That the application of Mr. E. White for Mr. I. Kiralfy, for an extension of the period within which the erection of a gangway in Wood-lane, Hammersmith, was required to be commenced, and of the period for which such

gangway was allowed to be retained, be granted.—Consent.

Deviations from Certified Plans.

Islington, East.—Deviation from the plans certified by the district surveyor so far as relates to the proposed erection of a new fire brigade station on the site of No. 1A, Hertslet-road, Nos. 80, 82, and 84, Mayton-street, Holloway, and the existing fire brigade station in that street (Mr. O. Fleming for the Fire Brigade Committee of the Council).—Consent.

Marylebone, East.—Certain deviations from the plan certified by the district surveyor so far as relates to the proposed re-erection of No. 78, Wigmore-street, St. Marylebone (Messrs. Treadwell & Martin).—Refused.

Formation of Streets.

Clapham.—That an order be issued to Mr. T. Young, sanctioning the formation or laying out of a new street for carriage traffic on the Cavendish House estate, Clapham-common, to lead from Cavendish-road to Clapham-common, South-side (for the Cavendish House Estate Company, Ltd.).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic to lead from Sunderland-road to Church-road, Perry-vale, Lewisham, so far as relates to a widening of such street by an alteration in the position of its northern boundary (Mr. E. C. Christmas).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of Eddystone-road and Buckthorne-road, Brockley, submitted with the applications of Messrs. Tompkins & Connew, so far as relates to a widening of the footway leading from the "Brockley Jack" public-house to Nunhead).—Consent.

St. George, Hanover-square.—Widening of Wallis's-yard, Prince's-row, Buckingham-palace-road (Mr. F. J. Smith for the guardians of the parish of St. George, Hanover-square).—Consent.

Wandsworth.—That an order be issued to Messrs Milner, Son, & White, sanctioning the formation or laying out of two new streets for carriage traffic out of the south side of Southcroft-road and a new street for carriage traffic out of the east side of Mitcham-road, Tooting.—Consent.

Space at Rear.

Finsbury, East.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed re-erection of the "White Horse" public-house, at the corner of Central-street and Paton-street, Finsbury, with an irregular open space at the rear (Messrs. Hubbard & Moore for Mr. A. E. Ball).—Consent.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a boys' home on the north side of Great Wild-street, Holborn, eastward of St. Giles's Christian Mission Chapel, with an irregular open space at the rear (Messrs. E. Runtz & Ford for Mr. W. Wheatley and others).—Consent.

Peckham.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of two buildings on the north side of Evelina-road, Nunhead, on the open space at the rear of No. 2, Kirkwood-road, and with irregular open spaces at the rear (Mr. N. Pellew).—Consent.

St. George, Hanover-square.—A modification of the provisions of sect. 41 so far as relates to the erection of additional rooms over the stables at the rear of No. 81, Eaton-square, St. George, Hanover-square (Messrs. G. Trollope & Sons & Colls & Sons, Ltd.).—Consent.

Hammersmith and Kensington, North.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of ten houses on the east side of Latimer-road, Hammersmith, without the requisite open space at rear (Mr. M. Minkler).—Refused.

Construction of Buildings.

Marylebone, West.—The continued use of the ground floor of the building at No. 34, North-street, St. Marylebone, as a battery-room, the use of the two upper floors of that building as offices and meter stores (Mr. F. A. Wilkinson for St. Marylebone Borough Council).—Consent.

Poplar.—An iron and concrete building at St. David's-wharf, West Ferry-road, Millwall (Mr. T. A. Watson for the Manganese Bronze & Brass Co.).—Refused.

Buildings for the Supply of Electricity.

Whitechapel.—A timekeeper's office, store, iron gangway across stokers' pit, and wooden folding doors across the western end of the existing drum store at the Osborn-street generating-station, Whitechapel (Mr. M. W. Jameson for Stepney Borough Council).—Consent.

Dwelling-houses on Low-lying Land.

Peckham.—Re-erection of the "Duke of Sussex" public-house on low-lying land situated at the corner of Commercial-road and Lower Park-road, Peckham (Messrs. Hubbard & Moore for Messrs. Barclay, Perkins, & Co., Ltd.).—Consent.

Rotherhithe.—Three dwelling-houses on low-lying land situated between Claremont-place and Wells-tenements, Lower-road, Rotherhithe (Messrs. Stock, Page, & Stock for the Gomm Estate Trustees, Rotherhithe, and Messrs. Bisley & Sons and their tenants).—Consent.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The last two sketching excursions of the Manchester Society of Architects have been a great success, although the party in each case was small considering the number of members. Hull was made the headquarters at the Bank Holiday week-end, being a good centre for the fine group of churches in the neighbourhood. Saturday was spent at Beverley in the minster and St. Mary's Church. Sunday morning was quietly spent, and the afternoon given to viewing the principal buildings in the town. Hull has been practically rebuilt within recent years, and is now admirably laid out with wide streets and avenues of trees. The XIVth-century parish church is the most important ecclesiastical building. There are also St. Mary's, by the late G. E. Street, which has a good covered ambulatory from the tower to the door at the west end, and Mr. Temple Moore's Saint Augustine's. This still requires the fine tower at the west end which is shown on a drawing inside the church. The Congregational Church of Messrs. Molds & Porrit, octagonal on plan, is in a freer style, and admirably meets its requirements. The new School of Art, by Messrs. Lanchester, Stewart, & Rickards, was very greatly admired. Monday was spent at the beautiful decorated church at Patrington. The nave and choir have circular wooden roofs, and the aisles are groined in stone with pleasing variety. The wide transepts enable delightful cross views to be obtained; the piers and arches are all most beautiful in proportion and detail. The transepts are each arranged for three chapels. The north now contains the organ, but on the south side the altar of the centre chapel is in an octagonal recess groined over, the large boss at the centre over the altar being hollowed out for a reliquary or tabernacle. The south porch has a parvise over, with charming little windows looking into the aisle. So difficult did the party find it to leave Patrington that only half an hour could be spent at Hedon, where the glorious centre tower (Perpendicular) made them regret that sketching on this trip was finished. The north transept here is a very fine specimen of Early English work. On Saturday, the 18th, Bunbury Church, in Cheshire, was visited. Beeston Castle station was reached about 10.30 and Bunbury Church at 11. The present building was commenced about 1380 by Sir Hugh Calveley, who founded a college here, but there are sufficient remains to show that a Norman church once existed. There is a fine dignified tower at the west end, with buttresses on the west face only, and over the south porch is a statue of S. Boniface, the patron saint. Internally the nave has very light and graceful Perpendicular shafts. The Egerton Chapel occupies the east end of the south aisle, being separated from the chancel by a fine stone screen occupying three bays of the arcade. The small oak door to this chapel is made of 1-in. planks beautifully carved with open lattice-work in the upper part and shields below in very low relief. Returning to Beeston, the fine outline of Peckforton Castle rising above the hills could be seen strikingly outlined by the setting sun.

CATTLE MARKET, NEWTON.—The opening of the new cattle market at Newton Abbot took place on the 22nd ult. The market will afford accommodation for 50 cows and calves, 181 bullocks, 72 calves, 1,464 sheep, and 130 pigs. The area of the market is 3,612 yards. The contract price was 2,185*l.*, and the work has been carried out by Mr. Herbert Parker, the contractor. The floor has been laid with cement concrete. There are two entrances, one for bullocks, cows, and calves, and the other for sheep and pigs. A covered shed has been erected for cows and calves, and a partly covered shed for sheep and pigs. Mr. L. Stevens, surveyor, prepared the plans.

THE LONDON COUNTY COUNCIL AND HOUSING.

DR. G. P. BATE, the Medical Officer of Health for Bethnal Green, has some severe criticisms of the London County Council with reference to housing for the working classes, in his annual report just circulated. He says that no advance has been made during the year towards the clearing of unhealthy areas in Digby-street and Brady-street. The Housing of the Working Classes Committee of the London County Council upon being applied to refused to recommend their council to prepare a scheme, on the ground that the area would probably be re-developed in the near future by private enterprise. "From what I can ascertain," continues Dr. Bate, "the hopes of the London County Council are premature, there is no prospect of this area being redeveloped by private enterprise for many years, and in the opinion of the Borough Council it is nothing less than a public scandal that the present condition of things should continue indefinitely. The early rebuilding excuse is an old one and does not redound much to the inventiveness of the London County Council and its officers; for recently Mr. Foot, our chief inspector, during a search in the Record Office at Spring-gardens amongst some old plans and drainage applications, came across a bundle of correspondence dated 1854 respecting the removal of some cesspools and the redrainage of certain premises in this very area. The then surveyor to the Metropolitan Board of Works (the predecessors of the London County Council) recommended:—'That having regard to the small and fourth class character of the property and its aged and worn-out condition generally, it would only be necessary to make arrangements for its temporary drainage as the premises would soon come down.' This occured over fifty years ago, yet the temporary system of drainage was only recently remodelled and the houses are standing and inhabited to-day, notwithstanding my repeated representations under the Housing Acts backed up as these are by the Borough Council. As a result of the frequent inspection of the area by the officers of the London County Council and the supposed probability of the early acquirement of the property by that authority, some speculative house jobbers thought they saw their way to make a profit out of the scheme by resale at an advanced price. Upon the abandonment of the scheme these gentlemen found themselves left in the lurch. Moreover, having paid full value for the property, they are naturally indisposed to spend more money upon repairs than they are absolutely compelled to do. As a result, the decay and dilapidation of the houses have increased, many of them are void, and the appearance of the fronts is most forlorn and depressing. Although hundreds of pounds have been spent by the Borough Council upon combined drains (sewers by law), the unhealthiness of the area has intensified. . . . We have followed the advice of the County Council and have attempted to deal with single houses, but the result so far is not encouraging. We appear to have arrived at an absolute *impasse*. Bethnal Green cannot clear these sites, and the statutory authority under Part I. of the Housing Acts refuses to help. I am afraid that the London County Council is of opinion that Bethnal Green has had its share of public money in Boundary-street. Moreover, the members of this august body form to a certain extent a mutual admiration society. They are not particularly anxious to clear areas in back slums, but prefer public improvement schemes in prominent positions to which they can refer for their own glorification."

Correspondence.

THE "HAYCOCK," WANSFORD.

SIR,—I am much interested in the account of the Architectural Association excursion, as I am well acquainted with the locality. With reference to the legend about the Haycock, I send you some particulars from an old gazetteer, the 7th edition, published in 1822:—"It is noted for the story of a man who was carried down the stream at this place by the sudden rise of the river, as he slept on a haycock, supposed to be the famous Barnaby Harrington, better known by the title of 'Drunken Barnaby,' who has given us an account of the adventure in one part of his entertaining journey—

"'Thence to Wansforth Briggs—a river
And a wife will live for ever;
River broad, an old wife jolly,
Comely, seemly, free from folly;
Gates and gardens neatly gracious,
Ports and parks and pastures spacious.

On a haycock sleeping soundly,
The river rose and took me roundly
Down the current; people cried;
Sleeping down the stream I hied;
Where away, quoth they, from Greenland?
No; from Wansforth-Briggs, in England.'"

This adventurer flourished in the beginning of the XVIIth century.

Before the advent of the railway Wansford

was a great centre for trade in corn, timber, and coal, etc., and I have no doubt at the time of Barnaby's escapade a considerable trade was carried on, down to the time I can remember, beyond the date when the Duchess of Kent and the Princess Victoria stayed a night at the Haycock—posting (as was then the only way) when on their journey north—which was, I suppose, about two years before King William the Fourth died—more than seventy years ago.

The bridge had, as reported, thirteen arches, two being carried away by a heavy flood the latter part of the eighteenth century, and one wide arch formed at the south end of the bridge. The greater part of the remainder is very old and there are numerous masons' marks, especially at the north end of the bridge.

With reference to the church, it is wrong to call the chancel a restoration, as no such structure existed, and if any remains were found they would doubtless be of a simple early date—the indications, as I remember them, being of an Early English character. The tower and spire bear this out and were selected as worthy of record in Parker's Glossary. A curious Norman font should have been noticed.

There is an old farm-house, Sibberton Lodge, about ten minutes' walk from Wansford, well worth a visit—at one time the Manor House. This may not be of such interest to you as it is to me, and if any excuse is needed for a wandering pen, it is that I am writing about my native place.

HENRY HALL.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—VII.

14.—*Patent Glazing Systems.*

BRABY'S System of Glazed Roofing, with intermediate lap-piece, is illustrated in Fig. 33. The glazing-bar can be obtained either in zinc or in copper, as may be preferred, and, as shown in the section, the glass is supported directly on the metal. One good feature of the system is to be found in the method of lapping, whereby drips are rendered quite unnecessary. Braby's "Drop Dry" glazed roofing, with zinc or copper bars, is represented in Fig. 34. It will be seen that the bar comprises two essential parts—a sheath for the timber sash-bar providing a bearing for the glass, and a covering-cap attached by screws which pass through the sheath and hold the entire construction in place. Owing to the curved form of the two elements of the metal bar sufficient spring is provided to keep the metal tightly against the glass. The double roll of the lower section affords adequate protection against the penetration of rain or dust, and the channels formed on either side serve the purpose of carrying away any water that may percolate beneath the metal capping or gather as the result of interior condensation.

These bars can be applied in any length without drips by adopting the system of patent lapping illustrated in Fig 33.

The British Challenge Glazing differs from systems wherein the glass is placed upon the flanges of an inverted steel tee and covered by detachable capping, and from other systems where the capping is formed by lead wings drawn with the sheathing enclosing the steel tee-bar.

The Challenge glazing bar is made in several different sizes and patterns, but the essential principle of the design is as shown in Fig. 35, where it will be seen that the tee-bar, placed with the flanges upwards, is completely covered by a lead sheathing which has three substantial projections, two at the sides forming a yielding bed for the glass, and one in the middle from which the wings spring below glass level. In virtue of the latter feature the junction of the wings with the central lead core is not liable to be weakened when the wings are being dressed down upon the glass. Between the projections from the lead sheathing two channels are formed which can be utilised for carrying away any water that may find its way from the outer surface of the glass.

Seven sizes of Challenge bars, practically as described above, are made of suitable proportions for clear spans of 4 ft. 6 in., 6 ft., 7 ft., 8 ft. 6 in., 9 ft. 6 in., and 12 ft., respectively, and the seventh is a bar with extra wide wings to take glass ⅜ in. thick, the same section being also used for all bent work. Half or side-rail bars are obtainable of the pattern illustrated in Fig. 36.

Any of the foregoing bars can be let into timber moulding if desired, as represented in Fig. 37.

The bars are also made, as in Figs. 38 and 39, so that they may be fitted to timber sash-bars. The sheathing shown in Fig. 38 has two downward projecting strips that are simply tacked on to the timber bar. The bar represented in Fig. 39, termed a *strap-glazing bar*, is fastened by screws for which holes are drilled through the lead and steel in the channels on either side of the central core.

Fig. 40 shows the manner in which strap-glazing bars are applied to steel sash-bars.

The British Luxfer Improved Roof Glazing, with ordinary glass, can be applied to roofs of either timber or steel construction, and takes glass of the usual thicknesses used in roof covering.

The glazing bars are made in four distinctive types, which are illustrated in Figs. 41 to 44. No. 1 section, Fig. 41, for spans up to 6 ft. 6 in. between purlins, comprises a galvanised special rolled steel bar with copper or zinc capping held in place by gun-metal bolts and nuts, and shaped suitably for asbestos packing above the glass. No. 4 section, Fig. 42, for spans up to 10 ft. between purlins, is practically the same as the No. 1 section, except that the steel bar is rolled with a downward projecting leg to increase the resistance of the section to bending moment.

No. 5 section, Fig. 43, for spans up to 8 ft. between purlins, comprises a special rolled tee-bar entirely cased in a lead sheath which is provided with side wings for dressing down upon the glass.

No. 6 section, Fig. 44, for spans up to 8 ft. between purlins, is similar to No. 5 section, except that the special tee-bar is galvanised and provided with lead capping riveted to the upward projecting leg of the steel bar.

Luxfer Prism Roof Glazing can also be applied to timber or steel roof framework, and enables the architect to secure a maximum amount of diffused daylight for the interior of buildings where operations are conducted which necessitate an ample supply of well-distributed light.

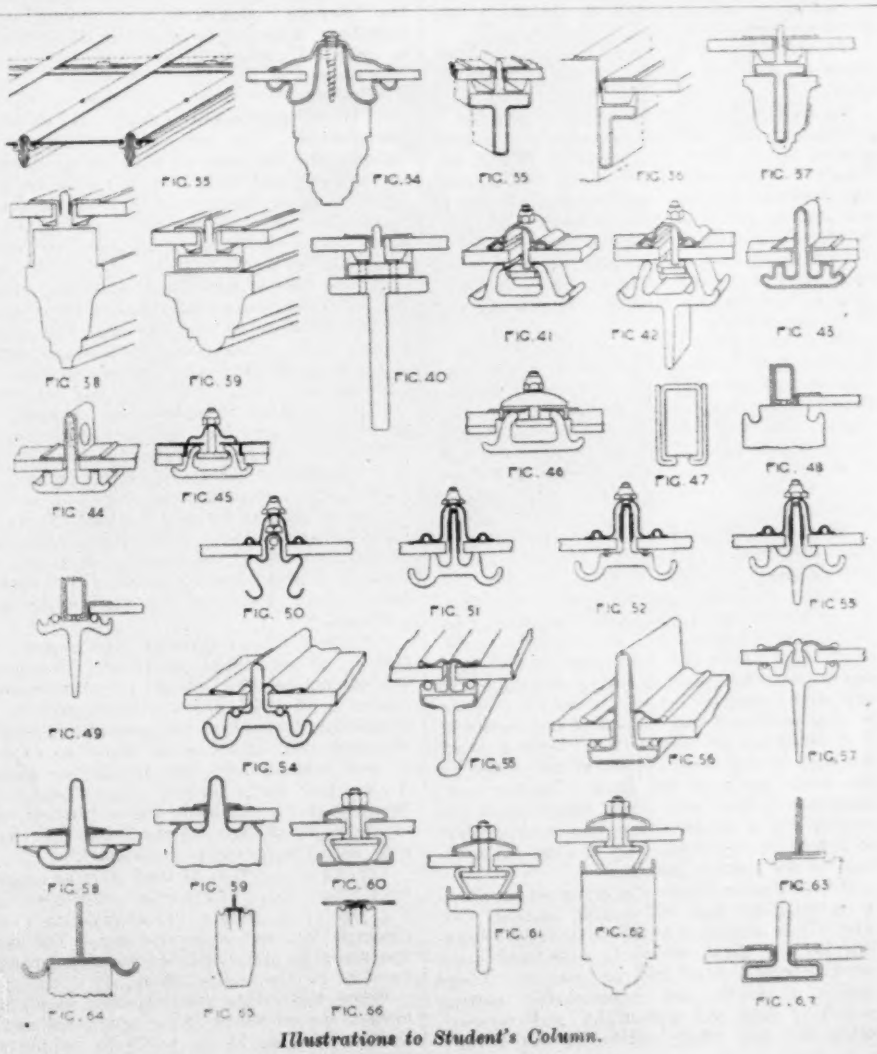
Fig. 45 is a section of the glazing bar used for skylights, and comprises a special rolled-steel galvanised section, and a zinc or copper cap secured by gun-metal bolts and nuts, and providing for asbestos packing on the upper surface of the steel frame in which the Luxfer prisms are carried. The bar shown in Fig 46 is of stouter construction, and the cap is of galvanised steel, secured by gun-metal bolts and nuts, and packed by flat asbestos strip. This pattern, however, is not now used, unless specially desired, as the bar illustrated in Fig. 45 is found to answer the same purpose quite satisfactorily.

Deacon's Patent Glazing is simple, and suitable either for wood or for steel bars. The characteristic feature of the system is illustrated in Fig. 47, where (*a*) is a timber core enclosed in a lead casing (*b*), provided with two wings (*cc*), which can be opened out and dressed over the sheets of glass. Being cut from sheets the lead is of uniform thickness, which can be varied if necessary. The lead-sheathed strips are made in two sizes, one for 21-oz. glass and the other for glass up to ¼ in. thick. They are secured to the sash-bars or rafters, as the case may be, by brass round-headed screws passed through holes bored with a brace and quill bit. One feature specially claimed by the patentee is that when the glass is in position the lead is automatically keyed on, and cannot be disturbed by wind pressure or vibration.

In timber roofs the bars, or rafters, may be of any desired section, but should be provided with semi-circular grooves for carrying away moisture condensed on the interior surface of the glass. It is recommended that the outer edge of these grooves should be about ¼ in. below the bearing for the glass.

Fig. 48 shows a lead strip attached to a timber bar with the pane of glass in position on one side and the lead wing turned down over the glass. The timber should be painted before glazing is commenced, and thick white lead paint applied below the glass and between it and the lead cap. As the ends of the cores are not covered by lead they should be protected by paint.

Fig. 49 shows a lead strip applied to a special rolled-steel section, having two grooves for asbestos cord bearings and two



Illustrations to Student's Column.

gangway was allowed to be retained, be granted.—Consent.

Deviations from Certified Plans.

Islington, East.—Deviation from the plans certified by the district surveyor so far as relates to the proposed erection of a new fire brigade station on the site of No. 1A, Hertslet-road, Nos. 80, 82, and 84, Mayton-street, Holloway, and the existing fire brigade station in that street (Mr. O. Fleming for the Fire Brigade Committee of the Council).—Consent.

Marylebone, East.—Certain deviations from the plan certified by the district surveyor so far as relates to the proposed re-erection of No. 78, Wigmore-street, St. Marylebone (Messrs. Treadwell & Martin).—Refused.

Formation of Streets.

Clapham.—That an order be issued to Mr. T. Young, sanctioning the formation or laying out of a new street for carriage traffic on the Cavendish House estate, Clapham-common, to lead from Cavendish-road to Clapham-common, South-side (for the Cavendish House Estate Company, Ltd.).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic to lead from Sunderland-road to Church-road, Perry-vale, Lewisham, so far as relates to a widening of such street by an alteration in the position of its northern boundary (Mr. E. C. Christmas).—Consent.

Lewisham.—A deviation from the plan approved for the formation or laying out of Eddystone-road and Buckthorne-road, Brockley, submitted with the applications of Messrs. Tompkins & Connew, so far as relates to a widening of the footway leading from the "Brockley Jack" public-house to Nunhead).—Consent.

St. George, Hanover-square.—Widening of Wallis's-yard, Prince's-row, Buckingham-palace-road (Mr. F. J. Smith for the guardians of the parish of St. George, Hanover-square).—Consent.

Wandsworth.—That an order be issued to Messrs Milner, Son, & White, sanctioning the formation or laying out of two new streets for carriage traffic out of the south side of Southcroft-road and a new street for carriage traffic out of the east side of Mitcham-road, Tooting.—Consent.

Space at Rear.

Finsbury, East.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed re-erection of the "White Horse" public-house, at the corner of Central-street and Paton-street, Finsbury, with an irregular open space at the rear (Messrs. Hubbard & Moore for Mr. A. E. Ball).—Consent.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a boys' home on the north side of Great Wild-street, Holborn, eastward of St. Giles's Christian Mission Chapel, with an irregular open space at the rear (Messrs. E. Runtz & Ford for Mr. W. Wheatley and others).—Consent.

Peckham.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of two buildings on the north side of Evelina-road, Nunhead, on the open space at the rear of No. 2, Kirkwood-road, and with irregular open spaces at the rear (Mr. N. Pellew).—Consent.

St. George, Hanover-square.—A modification of the provisions of sect. 41 so far as relates to the erection of additional rooms over the stables at the rear of No. 81, Eaton-square, St. George, Hanover-square (Messrs. G. Trollope & Sons & Colls & Sons, Ltd.).—Consent.

Hammersmith and Kensington, North.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of ten houses on the east side of Latimer-road, Hammersmith, without the requisite open space at rear (Mr. M. Minkler).—Refused.

Construction of Buildings.

Marylebone, West.—The continued use of the ground floor of the building at No. 34, North-street, St. Marylebone, as a battery-room, the use of the two upper floors of that building as offices and meter stores (Mr. F. A. Wilkinson for St. Marylebone Borough Council).—Consent.

Poplar.—An iron and concrete building at St. David's-wharf, West Ferry-road, Millwall (Mr. T. A. Watson for the Manganese Bronze & Brass Co.).—Refused.

Buildings for the Supply of Electricity.

Whitechapel.—A timekeeper's office, store, iron gangway across stokers' pit, and wooden folding doors across the western end of the existing drum store at the Osborn-street generating-station, Whitechapel (Mr. M. W. Jameson for Stepney Borough Council).—Consent.

Dwelling-houses on Low-lying Land.

Peckham.—Re-erection of the "Duke of Sussex" public-house on low-lying land situated at the corner of Commercial-road and Lower Park-road, Peckham (Messrs. Hubbard & Moore for Messrs. Barclay, Perkins, & Co., Ltd.).—Consent.

Rotherhithe.—Three dwelling-houses on low-lying land situated between Claremont-place and Wells-tenements, Lower-road, Rotherhithe (Messrs. Stock, Page, & Stock for the Gomm Estate Trustees, Rotherhithe, and Messrs. Bisley & Sons and their tenants).—Consent.

Architectural Societies.

MANCHESTER SOCIETY OF ARCHITECTS.—The last two sketching excursions of the Manchester Society of Architects have been a great success, although the party in each case was small considering the number of members. Hull was made the headquarters at the Bank Holiday week-end, being a good centre for the fine group of churches in the neighbourhood. Saturday was spent at Beverley in the minster and St. Mary's Church. Sunday morning was quietly spent, and the afternoon given to viewing the principal buildings in the town. Hull has been practically rebuilt within recent years, and is now admirably laid out with wide streets and avenues of trees. The XIVth-century parish church is the most important ecclesiastical building. There are also St. Mary's, by the late G. E. Street, which has a good covered ambulatory from the tower to the door at the west end, and Mr. Temple Moore's Saint Augustine's. This still requires the fine tower at the west end which is shown on a drawing inside the church. The Congregational Church of Messrs. Molds & Porrit, octagonal on plan, is in a freer style, and admirably meets its requirements. The new School of Art, by Messrs. Lanchester, Stewart, & Rickards, was very greatly admired. Monday was spent at the beautiful decorated church at Patrington. The nave and choir have circular wooden roofs, and the aisles are groined in stone with pleasing variety. The wide transepts enable delightful cross views to be obtained; the piers and arches are all most beautiful in proportion and detail. The transepts are each arranged for three chapels. The north now contains the organ, but on the south side the altar of the centre chapel is in an octagonal recess groined over, the large boss at the centre over the altar being hollowed out for a reliquary or tabernacle. The south porch has a parvise over, with charming little windows looking into the aisle. So difficult did the party find it to leave Patrington that only half an hour could be spent at Hedon, where the glorious centre tower (Perpendicular) made them regret that sketching on this trip was finished. The north transept here is a very fine specimen of Early English work. On Saturday, the 18th, Bunbury Church, in Cheshire, was visited. Beeston Castle station was reached about 10.30 and Bunbury Church at 11. The present building was commenced about 1380 by Sir Hugh Calveley, who founded a college here, but there are sufficient remains to show that a Norman church once existed. There is a fine dignified tower at the west end, with buttresses on the west face only, and over the south porch is a statue of S. Boniface, the patron saint. Internally the nave has very light and graceful Perpendicular shafts. The Egerton Chapel occupies the east end of the south aisle, being separated from the chancel by a fine stone screen occupying three bays of the arcade. The small oak door to this chapel is made of 1-in. planks beautifully carved with open lattice-work in the upper part and shields below in very low relief. Returning to Beeston, the fine outline of Peckforton Castle rising above the hills could be seen strikingly outlined by the setting sun.

CATTLE MARKET, NEWTON.—The opening of the new cattle market at Newton Abbot took place on the 22nd ult. The market will afford accommodation for 50 cows and calves, 181 bullocks, 72 calves, 1,464 sheep, and 130 pigs. The area of the market is 3,612 yards. The contract price was 2,185*l.*, and the work has been carried out by Mr. Herbert Parker, the contractor. The floor has been laid with cement concrete. There are two entrances, one for bullocks, cows, and calves, and the other for sheep and pigs. A covered shed has been erected for cows and calves, and a partly covered shed for sheep and pigs. Mr. L. Stevens, surveyor, prepared the plans.

THE LONDON COUNTY COUNCIL AND HOUSING.

DR. G. P. BATE, the Medical Officer of Health for Bethnal Green, has some severe criticisms of the London County Council with reference to housing for the working classes, in his annual report just circulated. He says that no advance has been made during the year towards the clearing of unhealthy areas in Digby-street and Brady-street. The Housing of the Working Classes Committee of the London County Council upon being applied to refused to recommend their council to prepare a scheme, on the ground that the area would probably be re-developed in the near future by private enterprise. "From what I can ascertain," continues Dr. Bate, "the hopes of the London County Council are premature, there is no prospect of this area being redeveloped by private enterprise for many years, and in the opinion of the Borough Council it is nothing less than a public scandal that the present condition of things should continue indefinitely. The early rebuilding excuse is an old one and does not redound much to the inventiveness of the London County Council and its officers; for recently Mr. Foot, our chief inpsector, during a search in the Record Office at Spring-gardens amongst some old plans and drainage applications, came across a bundle of correspondence dated 1854 respecting the removal of some cesspools and the redrainage of certain premises in this very area. The then surveyor to the Metropolitan Board of Works (the predecessors of the London County Council) recommended:—'That having regard to the small and fourth class character of the property and its aged and worn-out condition generally, it would only be necessary to make arrangements for its temporary drainage as the premises would soon come down.' This occured over fifty years ago, yet the temporary system of drainage was only recently remodelled and the houses are standing and inhabited to-day, notwithstanding my repeated representations under the Housing Acts backed up as these are by the Borough Council. As a result of the frequent inspection of the area by the officers of the London County Council and the supposed probability of the early acquirement of the property by that authority, some speculative house jobbers thought they saw their way to make a profit out of the scheme by resale at an advanced price. Upon the abandonment of the scheme these gentlemen found themselves left in the lurch. Moreover, having paid full value for the property, they are naturally indisposed to spend more money upon repairs than they are absolutely compelled to do. As a result, the decay and dilapidation of the houses have increased, many of them are void, and the appearance of the fronts is most forlorn and depressing. Although hundreds of pounds have been spent by the Borough Council upon combined drains (sewers by law), the unhealthiness of the area has intensified. . . . We have followed the advice of the County Council and have attempted to deal with single houses, but the result so far is not encouraging. We appear to have arrived at an absolute *impasse*. Bethnal Green cannot clear these sites, and the statutory authority under Part I. of the Housing Acts refuses to help. I am afraid that the London County Council is of opinion that Bethnal Green has had its share of public money in Boundary-street. Moreover, the members of this august body form to a certain extent a mutual admiration society. They are not particularly anxious to clear areas in back slums, but prefer public improvement schemes in prominent positions to which they can refer for their own glorification."

Correspondence.

THE "HAYCOCK," WANSFORD.

SIR,—I am much interested in the account of the Architectural Association excursion, as I am well acquainted with the locality. With reference to the legend about the Haycock, I send you some particulars from an old gazetteer, the 7th edition, published in 1822:—"It is noted for the story of a man who was carried down the stream at this place by the sudden rise of the river, as he slept on a haycock, supposed to be the famous Barnaby Harrington, better known by the title of 'Drunken Barnaby,' who has given us an account of the adventure in one part of his entertaining journey—

"'Thence to Wansforth Briggs—a river
And a wife will live for ever;
River broad, an old wife jolly,
Comely, seemly, free from folly;
Gates and gardens neatly gracious,
Ports and parks and pastures spacious.

On a haycock sleeping soundly,
The river rose and took me roundly
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These bars can be applied in any length without drips by adopting the system of patent lapping illustrated in Fig 33.

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The Challenge glazing bar is made in several different sizes and patterns, but the essential principle of the design is as shown in Fig. 35, where it will be seen that the tee-bar, placed with the flanges upwards, is completely covered by a lead sheathing which has three substantial projections, two at the sides forming a yielding bed for the glass, and one in the middle from which the wings spring below glass level. In virtue of the latter feature the junction of the wings with the central lead core is not liable to be weakened when the wings are being dressed down upon the glass. Between the projections from the lead sheathing two channels are formed which can be utilised for carrying away any water that may find its way from the outer surface of the glass.

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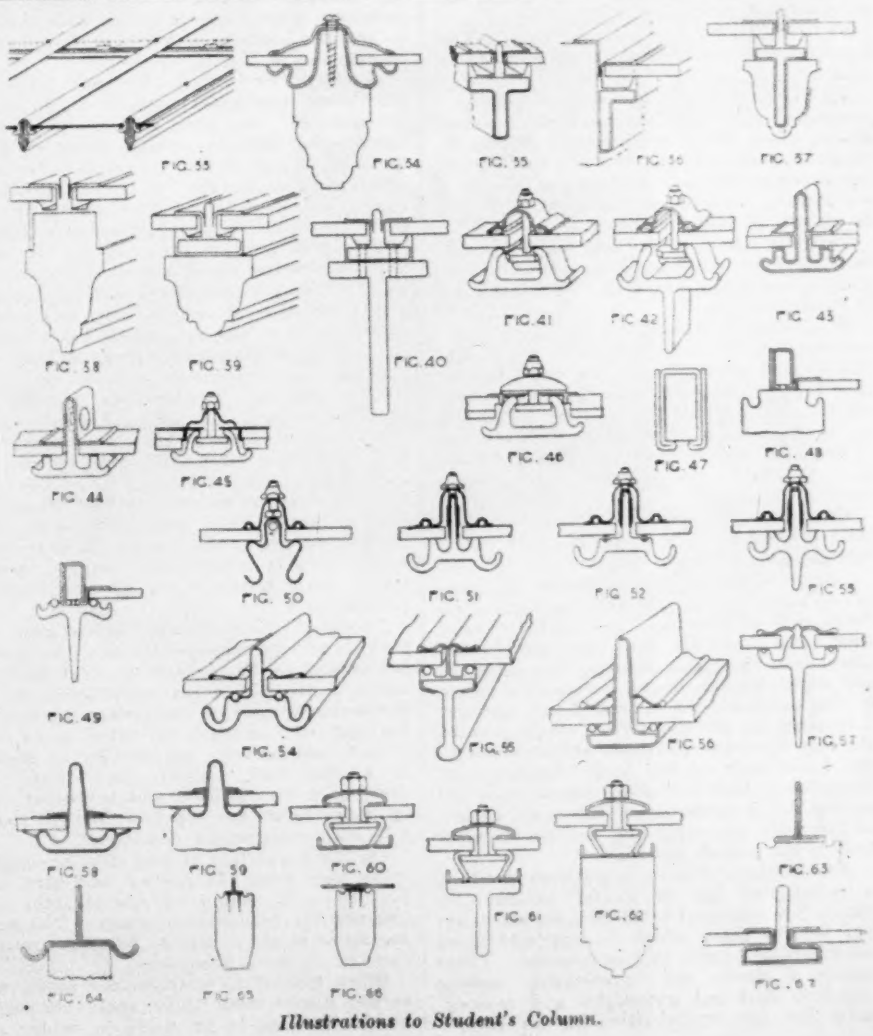

Illustrations to Student's Column.

other grooves serving the purpose of carrying away condensation water.

The Helliwell "Perfection" System of Glazing.—There are several different patterns of Helliwell glazing bars, typical sections of which are given in Figs. 50 to 53.

Fig. 50 illustratea a form of bar suitable for greenhouse and other light roofs; the bar proper, although of slender appearance, can be made of any thickness of zinc or copper, and possesses considerable rigidity owing to its corrugated form. It has sufficient spring to insure a close fit; the cap is shaped so as to hold a strip of asbestos cord under each web, and is held in place by brass tee-bolts and nuts, the tee-head of the bolts being inside the upper curve of the glazing-bar.

Fig. 51 shows in section a complete glazing-bar consisting of a special form of steel bar with condensation channels and a cap secured by brass tee-bolts and nuts, connected by clips to the upper web of the steel bar. The cap is shaped suitably for asbestos cord packing on the upper surface of the glass. This pattern bar is suitable for 6-ft. 6-in. spans between purlins.

Fig. 52 represents a somewhat similar section, in which provision is made for asbestos packing to receive the lower surface of the glass. This type of bar is recommended for flour mills, and is designed for 6-ft. 6-in. spans between purlins.

Fig. 53 is the section of a heavier bar capable of carrying glass in spans of 9 ft. between purlins. Bars of similar design to this are made suitable for 12-ft. and longer spans.

All the foregoing bars, with the exception of that illustrated in Fig 50, are simply galvanised or galvanised and also entirely covered with lead as a protection against corrosion, and the caps are furnished in zinc, copper, or lead.

The Helliwell New Patent Glazing System is offered as an alternative to the "Perfection" systems with detachable caps, and, as shown by Fig. 54, the bar consists of a special rolled-steel section completely encased in a lead or tinned-lead sheathing, with wings that can be dressed down over the glass. As usual in other systems where a similar device is employed the sheathing is drawn in one piece without joints.

Heywood's Patent Roof Glazing.—Two types of bars are applied in this system of glazing.

(1) *Partly lead-clothed* bars, comprising galvanised steel bulb-tee, upon which a lead glazing cap is fitted, as illustrated in Fig. 55, where A is the bulb-tee, B is the lead glazing cap drawn in one piece without joint, and CC are packing pieces of soft asbestos cord, rendering the glazing dust-proof.

These bars are most suitable for north light roofs, and are made in three sizes, to carry glass in lengths of 5 ft. 6 in., 7 ft. 6 in., and 11 ft. respectively.

(2) *Lead-clothed* bars, consisting of a galvanised tee completely encased in a lead sheath and glazing cap, the ends of the sheath being soldered up, thus hermetically sealing the steel bar. This type of glazing bar is shown in Fig. 56, where A is the tee, B the lead sheath and cap, drawn in one piece to avoid jointing, and C is asbestos packing.

These bars are made in three sizes to carry glass in lengths of 6 ft., 8 ft., and 11 ft. respectively.

In the Heywood glazing system the glass has an ample bearing, the asbestos packing reduces risk of breakage, and excludes rain, wind, and dust; the lead caps are dressed down upon the glass, adapting themselves to any slight irregularity of the surface, while leaving the panes free to expand and contract. The panes are prevented from slipping down the roof by means of copper stops riveted to the lower ends of the bars. Interior condensation is dealt with along the eaves of the glazing by a condensation bar with outlets at intervals conveying the condensed moisture to the outside gutters.

Hope's Patent Glazing is a system in which a rolled-steel bar of special section (see Fig. 57) is employed to afford adequate bearing for the glass, which is supported upon oiled asbestos cords laid in grooves. These insure a plastic and imperishable seating which is dust and watertight and compensates for any irregularities in the surface of the glass. The lead capping is attached by a dovetailed joint which dispenses with fastenings, the form of the capping permits it to be turned up or down without angular bends, and it cannot be cut by the edges of the glass. The glazing bars are fixed by means of angle brackets to the purlins, usually spaced 24 in. apart. These members carry the entire weight of the bars and glass, the screws or bolts merely serving to hold the bars in position.

Lead weathering bars are provided to prevent the ingress of rain, snow, or dust, and a gun-metal stop is fixed at the projecting end of every glazing bar.

The bars are made in two standard sizes to carry spans up to 9 ft. wide without intermediate support.

Mellowes' "Eclipse" Glazing possesses distinctive features which, the patentees claim, render it perfectly water-tight and impenetrable by dust. Fig. 58 is a typical section of the "Eclipse" glazing bar, which consists of a special form of tee, covered by tin-lead sheathing soldered at both ends, and having three projecting webs on each side, which are rubbed closely upon the glass, as shown in the section. Special importance is attached by the makers to the inner of the two upper webs.

To prevent snow or rain from drifting in between the glass and the framework, a lead wind-guard is fixed under the bottom end of the pane and between the bars, and provision is made for the escape of moisture arising from interior condensation.

The "Eclipse" bars are manufactured in five different sizes, for which the weights and maximum spans are given in the following table:—

No. of Section.	Weight of Bar per Foot Run.	Maximum Span Between Supports.	Usual Thickness of Rough Cast Plate.
6	2¼ lb.	4 ft. 0 in.	$\frac{3}{16}$ in.
7	3 lb.	6 ft. 6 in.	$\frac{1}{4}$ in.
8	3¾ lb.	7 ft. 6 in.	$\frac{5}{16}$ in.
9	4½ lb.	9 ft. 0 in.	$\frac{3}{8}$ in.
10	5¼ lb.	11 ft. 0 in.	$\frac{7}{16}$ in.

In order to provide for the application of the "Eclipse" glazing to roofs having timber sash-bars, a special form of the tin-lead cover is supplied, which is fixed in the manner represented in Fig. 59.

Rendle's "Invincible" System of Glazing has been considerably improved since its introduction, the bars having been made lighter and stronger so that sheets of glass up to 10 ft. and 12 ft. long can now be used. The essential feature of the system is a copper or zinc channel bar, drawn in one piece on which the panes of glass are placed and held in position by a cap of the same metal as the bar itself, the cap being secured by bolts and nuts at intervals of 12 in. apart.

Fig. 60 is a section showing the general arrangement of the bar, which has a central channel for dealing with any water that may find its way under the cap, and on either side of the bar condensation channels are provided to carry off condensed moisture.

Where the sheets of glass are longer than 4 ft., steel tees or moulded timber bars are employed, as illustrated in Figs. 61 and 62. In places such as railway stations, where the roof is exposed to sulphurous and other destructive gases, the timber bars are preferable to iron or steel tees, being preserved rather than destroyed by the products of combustion.

"Simplex" Lead Glazing, as the name implies, is of very simple character. No special subcontract need be entered into for its application, as the lead strips which constitute the distinctive feature of the system are sold by the foot run, and can be fitted to existing or new sash-bars by any builder or glazier. A wooden tool, termed the "boat," for dressing down the lead, and a printed sheet of instructions, are supplied free of charge with each consignment of material.

Fig. 63 is a section of lead strip as supplied ready for fixing to timber sash-bars, and Fig. 64 is a section of special strip with channels for condensation water. The strips are made in sizes suitable for glass ranging from 21 oz. up to $\frac{3}{8}$ in. thick.

When applied to small timber roofs, with rafters spaced about 15 in. apart, the rafters should be from 1½ in. to 1¾ in. wide, with two semi-circular grooves to provide for interior condensation (see Fig. 63). Similar grooves should be formed in the sash-bars employed between the rafters or principals of larger roofs. For end rafters and sash-bars half-section lead strips are supplied, made by cutting an ordinary section longitudinally through the middle, or any special strip can be made to suit flashings and other details.

The lead strips are laid along the rafters or sash-bars and secured by copper nails of 4-in. zig-zag pitch, so that the nails in each flange of the strip are 8 in. apart. When nailed in position the lead should be dressed perfectly flat on the wood. Fig. 65 shows a strip fixed on a sash-bar ready to receive the glass. The panes should be cut so that they fit easily between the vertical webs of the strips, the interior angles of which are coated with thick white lead paint before the glass is laid in place. It is recommended that any sheets of glass which are not quite flat should be laid, contrary to the usual practice, with the hollow side downwards, and that any which will not bed on all four sides should be rejected. When the glass has been put in place, the lead webs are turned down, as in Fig. 66, and dressed over with the tool.

Fig. 67 is a section showing the application of the "Simplex" system to iron sash bars.

Illustrations.

THE PALAZZO DEL COMMUNE, PIACENZA.

THE Palazzo del Commune at Piacenza is one of the finest brick-and-marble municipal buildings in Northern Italy. It was undertaken so far back as 1281 by the merchants of Piacenza. The ground floor shows the customary spacious arcade supporting the superstructure upon pointed arches. There are five of them on the principal façade, with six semi-circular arched windows over; the immense size of the building is difficult to convey in a drawing, as well as the elaborate and delicate scale of the ornament. The ground story is faced in white and red marble, while the upper part is of red brick with brick and terra-cotta ornament. The equestrian statues of the XVIth century are by Francesso Mocchi, and represent the Dukes Ranuccio and Alessandro Farnese; unattractive in themselves, they have a pictorial value in the fine Piazza de' Cavalli. The illustration is from a drawing by Mr. W. Curtis Green.

PACKING WAREHOUSE, MANCHESTER.

THIS building is a new packing warehouse and offices, Whitworth-street, Manchester, for Lloyd's Packing Warehouses, Ltd., and has been designed with a view to meet the demands of large shipping merchants, and is equipped with all the latest machinery for dealing with manufactured textiles for shipment in the most efficient and expeditious manner.

The base and entrance doorways are built of pink unpolished granite, supplied and wrought by Messrs. John Fyfe & Sons (Aberdeen). The remainder of the façades are of buff terra-cotta, semi-glazed, from Burmantofts (Leeds), combined with Accrington facing-bricks.

The main contractors are Messrs. Robert Neill & Sons, of Manchester. Messrs. Richard Moreland & Sons, of London, are supplying and fixing the whole of the steelwork, solid steel columns being used throughout.

Mr. Harry S. Fairhurst, of Manchester and Blackburn, is the architect.

BROOMHOLM, NAIRN.

THIS house was built in 1903. The walls are of rubble, harled yellow, with very little dressed stone.

The roof is covered with grey Welsh slates, the projection of the eaves, doors, etc., being painted a dark green.

The contractors were: — Mason — Mr. Farquharson (Nairn); carpenters — Messrs. Dunbar (Elgin); plumber — Mr. Brown (Nairn); slater—Mr. Reid (Nairn); plasterer —Mr. Campbell (Nairn); painter—Messrs. Kintrees (Elgin). The architect was Mr. W. R. Davidson.

W. Curtis Green del. April 1911

PALAZZ PIACENZA

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

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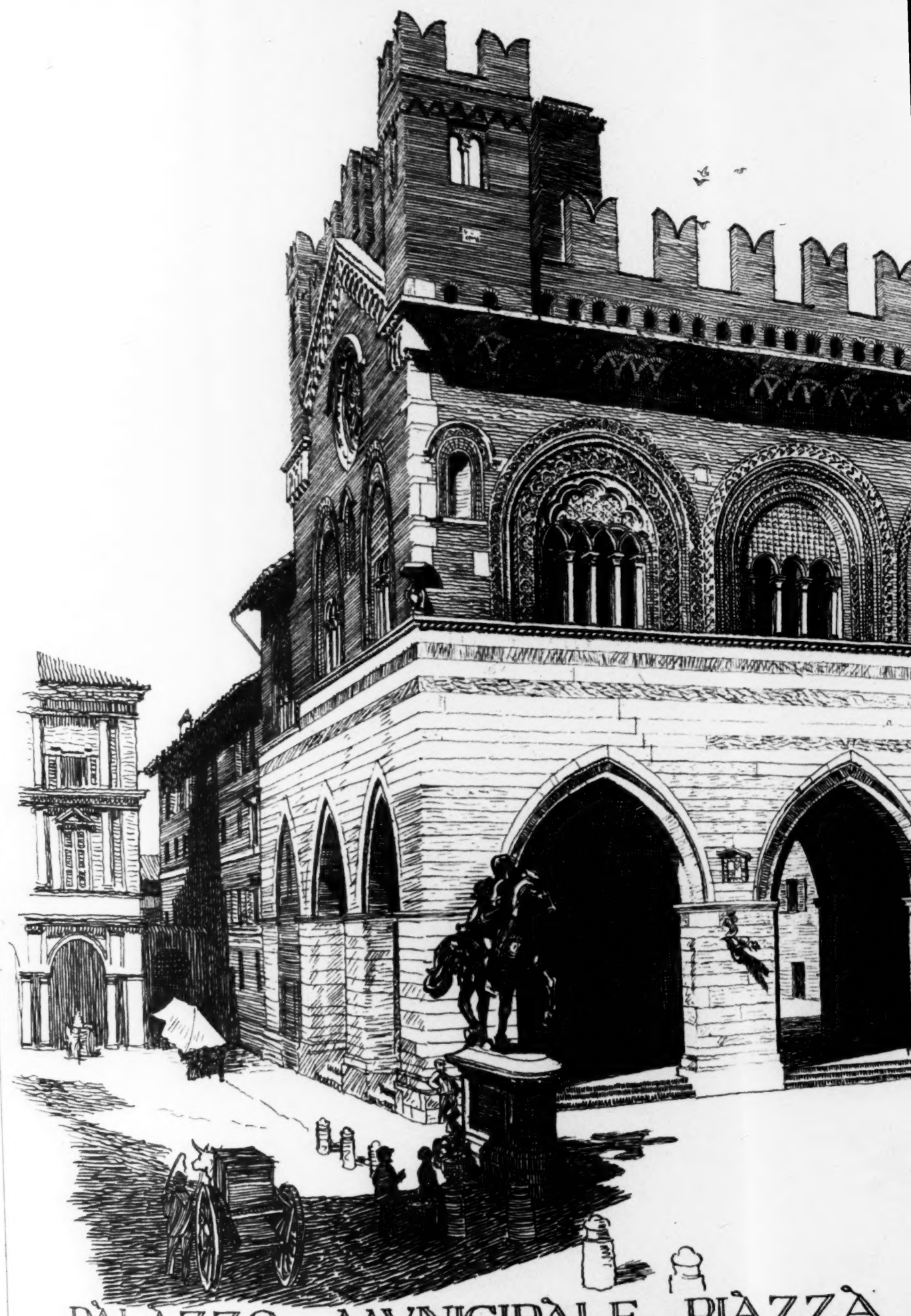


PALAZZO MUNICIPALE, PIAZZA

W. Parker Greer del. April 1906

ZA DE' CAVALLI PIACENZA

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

NEW PACKING WAREHOUSE AND OFFICES, MANCH

INK-PHOTO. SPRAGUE & C° L™ 4 & 5 EAST HARDING STREET, FETTER LANE E.C.

OFFICES, MANCHESTER.—Mr. Harry S. Fairhurst, A.R.I.B.A., Architect.

BROOMHOLM · NAIRN

·W·R·DAVIDSON · ARCHITECT·
·8·NEW·SQUARE · LINCOLNS·INN·W.C·

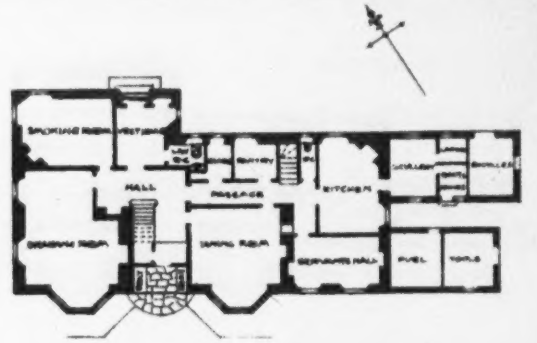
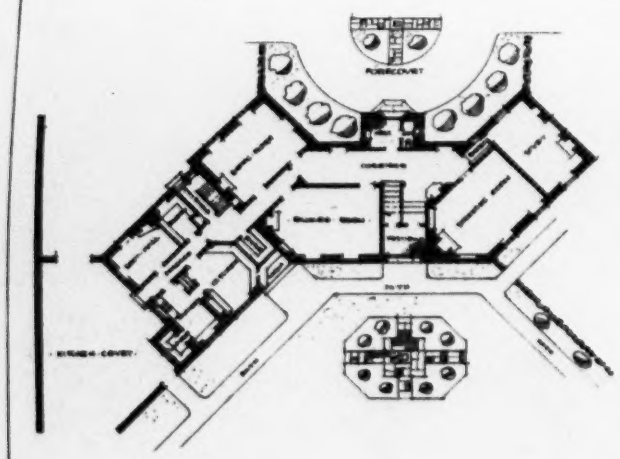


PHOTO LITHO SPRAGUE & C° LTD 4 & 5 EAST HARDING STREET FETTER LANE, E.C.



MOUSE AT HAIRA

FOR H. O. D. DAVIDSON, ESQ.

GARDEN FRONT

W. R. DAVIDSON, ARCHITECT
8 NEW SQUARE
LINCOLN'S INN, LONDON, W.C.

PHOTO LITHO SPRAGUE & C° LT° 435 EAST HARDING STREET FETTER LANE, E.C.

LINKSIDE, NAIRN.

THIS house was built in 1900, and added to in 1905. It is situated beside the golf links and about 200 yds. away from the sea.

The walls are of rubble, harled pure white with fine shingle from the beach, the dressed work being of the local stone, which is of a slightly pink colour.

The roof is covered with grey Welsh slates.

The vestibule is lined with ash stained green, and the hall is panelled with yellow pine stained green, with an oak floor and stairs and a fireplace of local stone.

The object aimed at was to build a small and unpretending house in the style of architecture peculiar to Scotland.

The contractors were:—Mason—Mr. Squair; carpenters—Messrs. McLean; plumber—Mr. Wink (all of Nairn); slaters—Messrs. Grey; plasterers—Messrs. Fowler & Kennedy (both firms of Inverness); and painters—Messrs. Garvie, of Aberdeen. The architect was Mr. W. R. Davidson, London.

BOOK RECEIVED.

THE CATHEDRALS OF ENGLAND AND WALES. Third series. By T. Francis Bumpus. (London: T. Werner Laurie. 6s. net.)

Trade Catalogues.

WE have received from the General Electric Company, of Queen Victoria-street, their monthly "progress sheet" and an interesting pamphlet on motor-car and carriage lighting. In the former an appreciable reduction in the price of the well-known Stanley d'Arsonval volt and ampere meters is announced. In the latter various novelties connected with the lighting, etc., of motor-cars are shown. We were interested in the electric direction indicator described. It enables the occupant of the motor-car or carriage to give full instructions to the driver by merely pressing a button on a push-board, which can be fitted in any convenient position inside. Approximate estimates are given for wiring a motor-car with head lights, two side lights, tail light, and roof light, and for the necessary accumulator. Adapters are also shown, by means of which it is possible to convert existing oil lanterns into electric lights without interfering in any way with the oil attachments. We notice that "osmi" lamps are recommended for motor-car lighting. The filaments of these lamps are made of the very rare metal osmium. They glow with extreme brilliancy, and have a high efficiency. Seeing that they are recommended for carriage lamps we presume that the mechanical strength of the filaments has been found satisfactory.

Obituary.

LIEUT.-COL. J. GALE.—We regret to announce the death at Carshalton, on August 6, of Lieut.-Col. Joseph Gale, V.D., one of the oldest Fellows of the Royal Institute of British Architects. Col. Gale became an Associate of the Institute in 1857 and a Fellow four years later, and practised in Bermondsey during the whole of his career as an architect. In 1903 he entered into partnership with Mr. J. Alfred Gotch and Mr. Arthur G. Leighton, under the style of Gale, Gotch, & Leighton, at his offices, 225, Long-lane, S.E. Amongst Col. Gale's works were some of the first schools for the School Board of London, St. Luke's Church and schools at Bermondsey, the Bacon schools at Bermondsey, and many warehouses, factories, and tanneries in and around the district. For many years Col. Gale was Surveyor to the Valuation Committee of Bermondsey and the London Leather Warehouse Company.

Appointment.

BRECHIN, FORFARSHIRE.—The Brechin District Committe of Forfarshire County Council have appointed Mr. Andrew Goodwillie, surveyor, Alford, surveyor for the Brechin district, in place of the present surveyors, who are retiring on being appointed consulting surveyors.

General Building News.

CHURCH IMPROVEMENTS, MOUNT HAWKE, PLYMOUTH.—Restoration work has been carried out at the Wesleyan Church at Mount Hawke. A new roof has been placed on the building, the church has been reseated throughout, while structural alterations have been carried out to the front of the premises. The chapel has been installed with Litz patent gas. The total cost of the work is about 850*l*., and the architect was Mr. Sampson Hill, of Redruth.

HOLY TRINITY CHURCH, HULL.—The tower of Holy Trinity Church, Hull, is in danger through the loosening of the foundations. The tower is built upon oak trees interlaced with each other, and these have rotted and caused a subsidence. Mr. F. S. Brodrick, of Hull, who is architect to the trustees, has had the tower under observation for two years, and recently reported that immediate action must be taken. The cost is estimated at 5,000*l*. Mr. Francis FOX, of Wimbledon, has made an inspection of the foundations, and he finds that it will be necessary to underpin the foundations and substitute brick work and concrete for the timber.

PRIMITIVE METHODIST CHURCH, ASHBY, LEICESTERSHIRE.—The buildings constituting the Primitive Methodist new church and schools, in Burton-road, Ashby, are now practically completed. The style of both church and schools is Gothic. The church is approached by two porches, connected with a corridor running the whole width. The measurements are 53 ft. by 35 ft. 8 in. within, and 40 ft. wide at the transept end. There is accommodation for 400, and the cost will be about 2,500*l*. The contractors were Messrs. Orton & Son, Ashby, and the architect Mr. Harry Smedley, of Ashby.

PARISH CHURCH, HILLINGDON.—Dr. Tristram, K.C., Chancellor of the Diocese of London, has agreed that a faculty shall issue for some alterations and improvements of Hillingdon church, near Uxbridge. The new works comprise the making of a better exit at the west end instead of the inconvenient doorway in the tower (which was built in 1629); the removal of the western gallery and screen under the tower; and the repair of the stonework of the belfry window and the west window of the tower. The church now contains 800 sittings; the proposed changes will abolish about fifty children's seats, which are not used, in the west gallery and about twenty-four sittings in open benches behind the tower arch. A small wooden staircase gives access to the gallery, for which a convenient oak lobby will be substituted. The estimated cost of the new works amounts to about 800*l*. The church, dedicated to St. John the Baptist, was enlarged by Sir G. G. Scott. In the graveyard is the tomb of John Rich (1761), comedian, of Covent Garden Theatre.

CHURCH RESTORATION, GLANDFORD.—The work of restoring Glandford Church has now been completed and the building reopened. The architects were Messrs. Hicks & Charlwood, of Newcastle. The whole of the carvings, both in wood and stone, were executed under the direction of Mr. C. W. Brown, of Grapes Hill, Norwich.

PROPOSED CHURCH RESTORATION, WIRKSWORTH.—The Wirksworth vestry have come to a final decision as regards the necessary repairs to the church. It is now about thirty-seven years since the extensive alterations were carried out under the advice of Sir Gilbert Scott, and, although nearly 10,000*l*. was spent, the sum was not sufficient to place this church in a satisfactory condition. The east end was left in a very unsatisfactory state, and two proposals by Sir Gilbert Scott to lengthen the nave by two bays and raise the chancel roof to a uniform level, have been a standing problem ever since. Last year, Mr. Temple More, of London, was invited by the vestry to inspect the church and give his opinion on its condition, and, in sending his report, the architect recommended three alternative schemes for dealing with the east end. The advice of Mr. Hodgson Fowler, of Durham, was also asked, and the vestry have accepted the advice of the two architects. The east end is to be repaired only as far as is absolutely necessary. The minimum agreed upon is to thoroughly repair the roof, remove all old plaster, panel the walls 5 ft. or 6 ft. high with oak, and place new hangings round the altar.

ROMAN CATHOLIC CHURCH, SEAHAM HARBOUR.—On the 25th ult. the foundation stone of the new St. Mary Magdalene's Catholic church at Seaham Harbour was laid. The church will be built entirely of moulded concrete blocks and to plans prepared by Father Hayes. It will provide seating accommodation for about 500, and is 102 ft. long over all, and 52 ft. wide. The church has a central aisle or nave and two side aisles, the nave arcading being formed with six semi-circular arches carried on circular columns, with square moulded bases and carved caps. Twelve pairs of windows light up the clearstory. There are a priest's sacristy and boys' sacristy, both opening into a corridor which will connect with the presbytery. The heating of the building will be by the low pressure radiator system, and special attention has been given to the ventilation. The exterior facings are built with rock faced blocks with drafted margins, and with plain faced jambs, arches, mouldings, and plinth courses, representing banker worked stone with rubbed or dragged faces. The interior will be built with blocks having smooth surfaces, and no plastering will be required on either walls or ceiling. The architect is Mr. Thomas Axtell, of Ryhope, and the cost of the new church and sacristies complete will be about 2,700*l*., but the total expenditure involved, including site and presbytery, is about 6,000*l*.

FREE METHODIST CHURCH, YARMOUTH.—A new Free Methodist church is to be built on Caister-road, Yarmouth. The plans have been prepared by Mr. A. S. Hewitt, of Yarmouth; Mr. I. S. Cooper is the contractor; Mr. R. G. Youngs will supply the stone work, and Mr. A. J. Davey is to be responsible for the painting.

COUNCIL SCHOOL, HOVE.—A new school has been erected by the Education Committee of the Hove Council in Portland-road, Hove. The new block provides for 600 children, and all the class-rooms are on the ground floor. There are two entrances (on the east and west), and two exits, all four of these being connected with the large central hall. Entering the school by the east door, which has a bell turret above it, a passage, paved with mosaic, leads direct to the central hall. The central hall is 56 ft. long by 35 ft., and has a wood block floor divided into squares for drill by teak inlays. Surrounding the hall are the eleven class-rooms, each providing for fifty or sixty children. All these rooms have the windows arranged to provide light to the left hand of the pupils. Each has an open fireplace fitted with one of Dr. Pridgin Teale's slow-combustion grates, and the walls below the tinted plaster have brown glazed brick dadoes. Similar dadoes run round the hall and passages, while white tiling is used in the cloak-rooms and lavatories. Retiring rooms for the masters and mistresses, heating chambers in the basement, and suitably isolated latrines are provided. Messrs. Clayton & Black were the architects, the builders being Messrs. Norman & Burt, of Burgess Hill, and the clerk of works Mr. W. Foster.

GIRLS' SCHOOL, LEEDS.—The new Leeds Girls' Grammar School is now approaching completion. It is a three-story building, and provides accommodation for 300 pupils. The principal feature of the ground floor is a central hall, 60 ft. by 30ft. A platform is erected at the south end, a panelled and moulded dado skirts the north and east walls, and the south side is divided from a corridor running the length of the building by moulded arches resting on fluted and moulded pilasters. The walls will be tinted green. At either end of the hall are cloak-rooms. At the west end is a reception-hall, 25 ft. by 23 ft.; and along the south front, at the opposite side of the corridor to the large hall, a room for the head mistress, three class-rooms, and a kindergarten room. A hanging stone staircase at each end of the corridor gives access to the first floor. A series of six class-rooms occupy the south front, and there is similar accommodation at the east and west ends. As on the floor below, a corridor runs the length of the building. Opening out with arches, it looks over into the central hall beneath. At each end, too, is a circular balcony also giving outlook on to the hall. There are music rooms at the back. On the north side of the second floor are art studios, besides a chemical laboratory, a physics laboratory, and a cookery laboratory. Connected with the school by a covered way is a gymnasium 84 ft. long and 32 ft. broad. There is a terrace in front of the school, and a carriage drive is being constructed from Headingley-lane to Victoria-road. The school will be lighted by electricity, and heated principally by a low-pressure hot water system. The contractors are Messrs. William Airey & Son, Leeds, Mr. W. J. Swain being the clerk of works, and Messrs. Connon & Chorley, of Leeds, the architects. The cost will be about 17,000*l*.

BOYS' SCHOOL, BARRY.—On the 24th ult. the opening of the new High-street Boys' School at Barry took place. The contractors were Messrs. Lloyd & Tape, Barry Dock, Mr. G. A. Birkenhead being the architect. The school has been designed to accommodate 398 children. There are nine class-rooms, two being for 36 children each, two for 40, two for 48, and three for 50, all communicating separately with an assembly-hall 49 ft. long by 30 ft. wide. The total cost of the buildings, playgrounds, outbuildings, boundary fences, etc., including the furnishing, will be about 6,500*l*.

COUNCIL OFFICES, PORT TALBOT.—The corner stone of the new offices of the Margam District Council was recently laid. The building, which has been designed by Mr. John Cox, Surveyor of the Council, will cost 2,000*l*., and will consist of council-chamber, committee-rooms, and offices for surveyor, rate-collector, and sanitary inspector.

IMPROVEMENTS, LOUGHBOROUGH.—Mr. R. H. Bicknell, M.Inst.C.E., sat at the Loughborough Town Hall on the 10th ult. to inquire into the Town Council's application to the Local Government Board to borrow sums of 2,760*l*. for the purchase and laying-out of land situate at the

junction of Great Central-road and Moor-lane as a recreation ground, and 140*l.* for the purchase of other adjoining land as a site for an open-air swimming bath. In the course of the inquiry Mr. A. H. Walker, the Borough Surveyor, gave evidence.

PROPOSED ASYLUM EXTENSION, WINWICK.—On the 14th ult. Mr. F. H. Tulloch, M.Inst.C.E., held a Local Government Board inquiry at Winwick Asylum into the application of the Lancashire Asylums Board for consent to borrow 21,000*l.*, for the erection of a new block of buildings to accommodate imbecile children. Mr. H. E. Clare (clerk of the County Council and Asylums Board) said that in 1896, when the Board first acquired the estate, they proposed to utilise the old hall for the use of imbecile children. But a certain amount of inconvenience had resulted owing to defects in the building, which rendered it undesirable to continue the use of the hall. The Visiting Committee were then faced with the question of what should be done, and they accordingly asked Mr. H. Littler, the County Architect, to make a report to them, and he presented it in 1904. He reported that the easterly portion of the house contained a number of good rooms and was in a comparatively good state of repair. The westerly portion was evidently the oldest part of the house, and was in a bad state of repair and unsatisfactory. It was not desirable to attempt to extend the existing building; if that was done it would be necessary to pull down the old westerly portion of the house. Even then it would be necessary to spend a considerable sum on the remaining easterly portion. The committee considered the report, and came to the conclusion that accommodation ought to be provided for at least 120 boys with the necessary attendants, that the old building should be pulled down and an entirely new building erected on modern plans. They advertised for an architect, and Mr. Thomas Chadwick, of Manchester, was appointed and asked to prepare plans for the building. He prepared plans, and after consideration they were approved by the Visiting Committee and the Asylums Board. It was proposed to provide accommodation for 120 boys under the age of fifteen, and sixteen of the ordinary paid attendants and twelve of the harmless patients who would be taken out of the Asylum and used as workers in the building. The estimate for the building, including the flooring, engineering, heating, ventilating, fire brigade, bridges, tiling, and sanitary fittings, was 19,007*l.*, and the laying out of grounds, fire hydrants, interior decorations, etc., and other items, made up the 21,000*l.*

BREAKING-UP OF LONDON STREETS.—The London County Council have addressed a circular letter to the metropolitan city and borough councils pointing out the desirability of making arrangements for the simultaneous execution at certain times of the year, as far as possible, of works carried out by authorities who are empowered to break up the streets. The Council direct attention to the Report of the Royal Commission on London Traffic, and invite the support and co-operation of the district councils in the event of their agreeing to promote legislation in the matter.

ISOLATION HOSPITAL, LLANTRISANT.—The new isolation hospital erected by the Llantrisant and Llantwit Fardre Rural District Council at a spot about half-way between Llantrisant and Tonyrefail, was recently opened. The surveyor, Mr. Gomer Morgan, drew the plans. The buildings consist of five blocks, and the cost, including purchase of site, amounted to 9,000*l.*

ENLARGEMENT OF THE CONVALESCENT HOME, HORSFORTH.—The Springfield Convalescent Home, near Horsforth, is about to be enlarged. Messrs. Walter A. Hobson & Co., of Leeds, are the architects for the work, their designs having been accepted in open competition.

Stained Glass & Decoration.

HOLY TRINITY CHURCH, RIFFEL ALP.—Messrs. Clayton & Bell have executed six stained-glass windows for this church, containing portraits of Dr. Salmon (to be inserted in the west window), and of Dr. Hort, Bishop Westcott, Bishop Lightfoot, and Archbishops Temple and Benson.

Sanitary and Engineering News.

MANCHESTER SHIP CANAL.—In their half-yearly report the directors announce that the canal traffic shows a steady and continuous increase, and that the revenue receipts amount to 233,176*l.*, leaving a credit balance of 99,295*l.*; the profits in respect of the Bridgwater canal were 18,258*l.*, an increase of 3,557*l.* during the six months. A balance of 117,553*l.* is carried to net revenue account making, with 1,477*l.* for bankers' and general interest, a total profit of 119,030*l.* for the half-year.

GREAT CENTRAL RAILWAY.—At the recent half-yearly meeting held under the presidency of Sir Alexander Henderson it was stated that the total receipts, 1,982,863*l.*, show an increase of 147,500*l.*, and render 790,622*l.* available for interest and dividends. The charges on account of wages, coal, traffic expenses, and maintenance of permanent way have increased by 91,926*l.*, of which 57,402*l.* represented additional wages. The total expenditure amounted to 1,305,373*l.*, being 65·83 per cent. as compared with 66·11 per cent. of the receipts for the corresponding six months of the previous year.

SEWAGE WORKS, DERBY.—The new scheme, which is now nearly completed, has cost upwards of 266,000*l.* The system includes outfall and purification works, together with main intercepting sewers for carrying the refuse to six septic tanks at Spondon for bacteriological treatment. The water after having been filtered and purified is conveyed into the Derwent.

NEW BRIDGE ACROSS THE ST. LAWRENCE.—Mr. F. Stewart Williamson, consulting engineer of the Department of Public Works in New York, and the American representative of the English engineering firm of Sir Douglas Fox and partners, responsible for the construction of the new bridge across the St. Lawrence in front of Montreal, has just made a statement to a Press representative to the effect that the work will be well under way by Christmas time and will be finished in a couple of years. The surveying operations had been practically completed. Asked as to the design, Mr. Williamson replied: "It will be a cantilever bridge, with a span of about 1,500 ft. length, and a clear heading of about 150 ft. It will also be of the double-deck pattern, and will afford accommodation for three railway tracks, two trolley tracks, two roadways, and two footpaths. The railway tracks will occupy the whole upper deck, as the trolleys and vehicles will need a quicker descent to the streets of the city. This part of the bridge will touch land at about St. Catherine's-street, while the upper portion will be continued for fully three-quarters of a mile further, where the terminal will be erected. The bridge will probably be the heaviest per foot ever constructed. The actual bridge work from end to end will be about two miles and a half in length." Mr. Williamson added that it is the plan of the Montreal Bridge and Terminal Company, as the promoters of the enterprise are known, to erect a union railway station at the Montreal end of the bridge for the use of the roads using it to get into the city. In connexion with the terminal the company have also decided on the construction of a large hotel equipped with every modern convenience.

PROPOSED EXTENSION OF FRASERBURGH HARBOUR.—The Fraserburgh Harbour Board have resolved to apply for Government grants and loans to the extent of over 100,000*l.* for the purpose of deepening the South Basin, erecting jetties thereon, completing the spur at Balaclava breakwater, widening Balaclava breakwater, and constructing a graving dock. The new scheme will give 11 acres of additional water space and 1,000 yds. additional quay space.

PROPOSED NEW WATER SUPPLY FOR STOCKPORT.—According to the *Manchester Guardian* the Kinder waterworks scheme of the Stockport Corporation is not to be abandoned. Recently the Corporation decided to determine the contracts with the engineer (Mr. E. L. Mansergh) and the contractor (Mr. A. Kellett), and this has led to a false supposition. As far as the stone dam is concerned, the work has been stopped and will not be proceeded with: but at a special meeting of the Stockport Town Council on the 19th ult. the Waterworks Committee brought forward a recommendation that an earthen dam should be constructed, and that fresh contracts should be entered into. A report of Mr. G. H. Hill, the engineer, upon the scheme was before the Council. Mr. Hill did not consider a masonry dam safe or practicable in the position in which the foundations had been prepared, and he strongly advised an earthen dam. The Council eventually decided to adjourn the further consideration of the recommendations until September 5, when the ordinary monthly meeting will be held. The whole scheme consists of the construction of three reservoirs—one at Kinder, one on the river Sett, and the other at Hollingworth. The first part of the scheme was the construction of the reservoir at Kinder, to be completed in seven years. The work was begun at the end of 1902, the contract being let to Mr. Abraham Kellett at 248,000*l.*, and Mr. James Mansergh being the engineer. At the end of 1903 the excavations for the masonry dam had reached the estimated depth: by the end of January, 1904, the limit of depth provided for in the schedule of extras, viz., 50 ft., had been reached. An extra depth of 20 ft. was sunk, and then, owing to the nature of the strata, it was considered advisable to call in fresh advice. The work was stopped for nine months, and the engineers consulted expressed doubts as to the safety of the whole scheme. At the meeting of the Stockport Town Council on August 1 it was decided to terminate the contracts with the engineer (Mr. E. L. Mansergh, who had been appointed to succeed his father) and the contractor. A satisfactory arrangement was entered into with Mr. Mansergh, but the Corporation would not accept the contractor's terms. A sum of between 70,000*l.* and 80,000*l.* has already been spent on the foundations of the masonry dam.

Foreign.

FRANCE.—M. Bartholomé, the eminent sculptor, has presented to the City of Paris an interesting collection of designs made by the architect Bartholomé, his grandfather, for the decoration of the chapel of the Invalides. They will be placed among the collection of engravings in the Carnavalet Museum.——The ancient church of St. Pierre at Montmartre, the restoration of which is nearly completed, is to be transformed into a museum.——The Salon d'Autoune is to be opened in October, at the Grand Palais of the Champs Elysées.——The Municipality of Nice has opened a competition for a new Lycée for boys, to be erected on the site of the present Lycée.——The second "Congrès Préhistorique" of France has been opened at Vannes, under the Presidency of M. Adrien de Mortillet, curator of the museum of antiquities of Saint Germain.——The town of Nancy is about to erect an asylum for the aged, a legacy of 600,000 francs having been left to the town with that object.——A sum of 358,000 francs has been voted by the Government for the erection of a new post-office establishment at Alençon.——The death is announced, at the age of sixty, of M. Charles Suisse, diocesan architect to the Côte d'Or, and architect-in-chief of Monuments Historiques for the Departments of Côte d'Or, Savoie, and Haute Savoie. He was a pupil of Jules André, and was architect for the restoration of the cathedral of Dijon, and of the churches of Saint Michel and of Saint Philibert, in the same town. He restored also the château of the Ducs de Savoie, at Annecy. He was the author of some valuable monographs on the ancient monuments of Burgundy.——The death is announced, at Dieppe, of the painter Georges Haquette, a pupil of Millet and of Cabanel. His first exhibit at the Salon was in 1875; he obtained medals at the Salons of 1878, 1880, and 1885, and a silver medal at the Universal Exhibition of 1900. Among his principal works are "La Bénédiction de la Mer"; "Le Depart pour Terre Neuve"; and "Le Lendemain d'une Tempête."

GERMANY.—In spite of the wealth of sights and excursions planned for the members of the Architectural Congress in London, foreigners felt that nothing was shown them that they could not have seen for themselves under ordinary circumstances. No opportunity was afforded for studying modern domestic architecture, in which the English excel. Although the invasion of a private house by large numbers certainly presents difficulties, it is thought that some effort might have been made to satisfy the wish entertained by all foreign visitors. It is curious that, whereas the English architect prides himself on his monumental work, it is his domestic work that is most highly appreciated by his foreign *confrères*. However, taken as a whole, the Congress was a great success. The numerous arrangements made for the instruction and amusement of members were heartily appreciated by those who are acquainted with the native reserve of the English.——The competition for the Hohenzollern Fountain, to be erected in Kleve, was won by the architect Jennen, of Berlin. The sculptural details will be entrusted to the sculptor, Prof. Breuer, of Berlin. The cost of the fountain will be 100,000 marks.——On August 6 died Franz Januskowski, in his sixty-fourth year. In him the State of Anhalt has lost its leading architect, and the loss will be the more keenly felt that Januskowski was in full work when he died.

ITALY.—In 1438 the invention of sluices by Philip degli Organi and Fioravante, of Bologna, revolutionised the building of canals which had been in use in Italy since the days of Claudius. After the XVth century canal building was neglected, and in the last hundred years even almost nothing fresh has been built. Italian canals, as opposed to those in France, Germany, Austria, England, and Russia, are not used exclusively for navigation, but for irrigation, for manufacturing purposes, and for land drainage. Navigation often suffers in consequence, the depth of an Italian canal rarely reaching 2 mètres. Legislation is attempting to deal locally with the question by ordering the factories in the valley of the Po to shut off their water supply two days a week. According to Italian law not only is the bed of river or stream State property, but so is all the land watered by these at the normal high-water level, including islands. Thus the management and construction of waterways all falls on the Government. Since the Parliament has lately taken up the subject it is to be hoped that Italy will shortly be on a level with the other civilised countries of Europe, and so increase her commerce and industries. It is owing to Casana, the former Minister of Public Works, that the question was raised, and not too soon, for of late the yearly expenditure on the upkeep of the waterways averaged the paltry sum of 330 lire per kilomètre.

AUSTRIA.—It is small wonder if modern buildings often display haste and lack of thought in their design. Two large important buildings have recently been put out to competition, and in one case three weeks was the time limit given, while in the other case four weeks. This extraordinary limitation of time shows either gross ignorance of or contempt for the intellectual work of the architect.——It is proposed shortly to begin building the new kursaal in Salzburg. A sum of 900,000 krone has been voted, and the work entrusted to Messrs. Fellner & Helmer, architects. The great hall will have an area of 770 sq. mètres, besides having a large stage for orchestral performances. The style adopted will be that of Fischer von Erlachs, who designed many of the beautiful buildings in and around Salzburg.

SERVIA.—The *Moniteur des Intérêts Matériels* (Brussels) states that tenders will shortly be invited by the Servian Government for the construction of a new royal palace at the cost of 4,500,000 fr. (about 180,000*l.*), and new parliamentary buildings at the cost of 1,500,000 fr. (about 60,000*l.*).—*Board of Trade Journal.*

Miscellaneous.

CHINA CLAY WORKS, DARTMOOR.—A somewhat novel enterprise is undertaken by a syndicate who have arranged to take a lease from the Duchy of Cornwall of about 1,400 acres at Redlake. The scheme of their engineer, Mr. R. H. Worth, provides for the conveyance of the clay-charged water through a 9-in. earthenware pipe from pits at the deposits to Ivybridge, where the water will be treated for the separation of the clay. The clay will then be carried from the drying-house to the railway. A tramway-line is to be constructed from Ivybridge to the deposits, for the use of the workmen and the transport of plant and materials.

ARTISANS' DWELLINGS AND HEALTH.—Dr. L. T. Fraser Bryett, Medical Officer of Health for Shoreditch, gives some interesting particulars in his annual report which has just been circulated as to the health of the inhabitants, numbering 7,769, in the forty-four blocks of artisans' dwellings which have been specially constructed in the borough for the accommodation of the working classes. He divides the dwellings into two classes, A and B; the former include all those which from the general aspect of the dwellings and the appearance of the dwellers are occupied by persons of the working class in comfortable or fairly comfortable circumstances; in class B the persons are not in comfortable circumstances, and a large proportion of them are extremely poor. The dwellings themselves, he says, are, with a few exceptions, structurally satisfactory, and save in one instance their sanitary condition was generally satisfactory; also in a number of them the standard of sanitation is high and leaves little to be desired. With regard to the rest, although sanitary defects of minor importance were observed, they could not be classed otherwise than satisfactory. The great drawback from a health point of view with respect to artisans' dwellings is the aggregation of population on the areas covered by the buildings. In some cases the density of the population per acre is very great. Dr. Bryett sums up the results of his investigations as follows:—"During the year the mortality amongst the residents in the artisans' dwellings in Shoreditch was lower than that of the borough as a whole: it was markedly lower amongst the residents in the class A dwellings, but amongst those in the B class it was markedly higher than that of the borough. Taking them as a whole, attacks of notifiable infectious disease were somewhat more frequent in the dwellings than in the borough generally, whilst the attacks were less frequent in the class A dwellings; in the class B they were much more frequent than in the borough as a whole, the incidence being nearly twice as great."

WATER SUPPLY TO TENEMENT HOUSES.—"So far as this borough is concerned," says the Medical Officer of Health for Shoreditch in his annual report which has just been circulated, "the Health Committee, after inquiry, were satisfied as to what was being done to secure a proper and sufficient water supply for tenement houses and it may be added that the matter of the water supply to all premises is one which has received a great deal of attention on the part of the sanitary authority in the borough. Shoreditch possesses many tenement houses in which every floor has a water supply of its own, the houses having been specially built or adapted for the purpose of being let in tenements. There are, however, numbers of small houses of from four to six rooms each which were built to accommodate single families but which have come to be occupied by members of more than one family. To lay water on the floors above the ground floor in many of these houses would involve considerable structural alterations. Sinks and waste pipes would have to be provided, otherwise the necessity would be continually arising of having to deal with houses flooded, owing to taps being left running. Moreover, in many of the houses the only possible situations to be found for the sinks within the dwellings without radical structural alteration would be within the dwelling-rooms themselves, and sinks in dwelling-rooms are not altogether free from objection on sanitary ground, especially where there are children. The practice in the borough is to require additional water taps where the circumstances appear to render the provision of such necessary in connexion with tenement houses, but there is no hard-and-fast rule on the subject."

BUILDING AND WOOD TRADES OF DANTZIG.—Col. Brookfield, H.M. Consul, reporting on the trade and commerce of the district of Dantzig for the year 1905, mentions that most branches of industry flourished during that period, and an indication of this was to be seen in the great activity that prevailed in the building business, which was in due course communicated to various subsidiary trades. New houses springing up in every direction have been a characteristic feature of the last two years, and there is no present sign that these operations are at all likely to cease. Building materials, such as stone, cement, fire-bricks, tar, pitch, and roofing materials came to Dantzig in 1905 in large quantities, both from the interior and by sea; 2,018 tons of asphalt, 782 tons of fire-brick, 216 tons of fire-clay goods, 182 tons of stone, 605 tons of tar, and 100 tons of pitch were imported from the United Kingdom. Most of the cement for building, brought by sea, came from Pomerania, which sent 15,703 tons; most of the stone came from Sweden and Norway, which sent 50,038 tons; but the United Kingdom was the chief exporter to Dantzig of the fire-bricks and tar used for building purposes. Want of water in the Vistula again caused loss and inconvenience to those engaged in the timber business, which was at the same time injuriously affected by an absence of trucks on the Russian railways. The supply of wood that reached Dantzig was considerably larger than in the preceding year, when there was a more serious drought, but a great proportion of the stock was wood which ought to have arrived the year before. The following shows the number of rafts coming to Dantzig during the years 1903-05 with the amount of wood and its estimated value:—

Year.	No. of Rafts.	Loads of Wood.	Value. *l.*
1903	486	308,450	700,720
1904	205	190,686	458,839
1905	492	329,416	745,710

The export of wood by sea from Dantzig amounted to 159,833 tons as against 167,119 tons in 1904 and 324,648 tons in 1903, and of these quantities the amount which was sent to the United Kingdom was 87,393 tons as against 78,730 tons in 1904, and 324,000 tons in 1903. With regard to the prices of timber generally, they ruled much the same as in the preceding year, with some small fluctuations. For the staple articles of the wood trade which are sent to the United Kingdom the prices per load were as follows:—Redwood crossing blocks, 13½ to 14½ in. sq., 9 to 17 ft. long, 3*l.* to 3*l.* 5*s.* (f.o.b. Dantzig); crossings, with one cut through the middle, 3*l.* 2*s.* 6*d.* to 3*l.* 7*s.* 6*d.*; redwood crossing blocks, 11½ to 12 in. squ., 9 to 17 ft. long, 2*l.* 5*s.* to 2*l.* 10*s.*; crossings, with one cut through the middle, 2*l.* 7*s.* 6*d.* to 2*l.* 12*s.* 6*d.*; redwood sleeper blocks, 10 in. sq., 8 ft long, 50 per cent. sharp-edged, with 9 in. surface, 40 per cent. not less than 8 in. surface, and 10 per cent. not less than 7 in. surface, 2*l.* 5*s.* 6*d.* (f.o.b. Dantzig).

LEEDS INSTITUTE, DEPARTMENT OF BUILDING.—The results of the May examinations in building construction, just issued by the Board of Education, show that out of 101 students examined in this department no fewer than 87 have passed; 36 of these obtaining first-class certificates and 51 second-class, there being only 14 failures. Successes have been gained in all four stages of the subject. This is the best result yet obtained at the Leeds Institute, the average for the last two years being about 80 per cent., while this year's results are well over 86 per cent. Next session's opening lectures are to be given on September 10 and 12 respectively, at 7.30 p.m., by the head of the department (Mr. James Neill), and are entitled: 1. "The Training of the Modern Architect." 2. "The Education of the Builder." Admission to the lectures is free. There were 870 class students in this department last session.

BRITISH MUSEUM.—The annual report sets forth that the excavations begun in 1903 upon the site of ancient Nineveh were completed in February of last year. The ruins were cleared of the site of the Temple of Nabu, but it had been found impossible to even make a plan in its entirety as the building had been destroyed and burned, it is presumed by the Elamites, when the city was captured. The attendance-returns for the year 1905 evince that the recent steady increase in the number of visitors at Bloomsbury, which in 1904 amounted to 954,441, had suffered a re-action, the total being reduced to 813,659. The number of visits of students to the Reading-room diminished from 226,323 to 214,940, a daily average of 711, with an average in the room, counted at 4 p.m., of 352. On the other hand the number of visits to the Natural History Museum, South Kensington, was 566,313, a large increase over all previous totals, and the first excess beyond half a million since the galleries were opened.

PROPERTY SALES.—The Pembridge Castle estate in South Herefordshire, of which some portions were recently sold at auction, included one lot (bought for 3,000*l.*) consisting of Pembridge Castle farm, 270 acres, and the ruins of the castle of which the history is traced during seven centuries past. It was the scene of the ministrations of the Martyr, Father John Kemble, who was buried in the neighbouring church of Welsh Newton; the castle was held by a Royalist garrison in 1644.—The freehold, with goodwill and possession, of the Red Lion Hotel, Hampton, has been sold for 3,620*l.*; the inn was occupied by some of the workmen employed in the building of Hampton Court.—The property in Islington and Lambeth, belonging to the trustees of the Right Hon. T. Milner Gibson, deceased, has been sold in 190 lots, for 100,185*l.*, the rack-rentals amounting to an estimated total of 16,500*l.* per annum. In many instances the purchasers were the present lessees and occupiers, on whose behalf the vendors undertook to allow two-thirds of the market value of any lot to remain on mortgage at 4 per cent. per annum. In respect of Gibson and Milner squares, Islington, the trustees, as the freeholders, agreed that in order to obviate any risk of building upon the gardens of the two squares, the freehold should remain vested in the vendors until after the completion of the sales, and to then consider any scheme formulated by the purchasers for a conveyance of the squares to trustees for maintenance and regulation as open spaces, under the London County Council's London Squares and Enclosures (Preservation) Act.—Hurstmonceaux Castle, Sussex, and the Gask estate, Perthshire, are placed in the market. The latter consists of over 4,500 acres, the seat during six hundred years of the Oliphants of Gask; in the grounds of the mansion-house, overlooking Strathearn and the Ochil Hills, are the ruins of "the auld hoose" of Lady Nairne's ballad. Hurstmonceaux Castle has a fine old walled and terraced garden, a moat, now drained, and 182 acres of park and woodland. It was built of brick with stone dressings by Henry VI.'s treasurer, Sir Roger de Fiennes; most of the interior was dismantled in 1777; the ruins include the ivy-covered flanking towers of the main gateway and of the watch-turrets and courtyards; the castle is rectangular on plan, 206 ft. by 214 ft. Francis Grose, the antiquary, made drawings of the walls before they had fallen into decay.

Patents of the Week.

APPLICATIONS PUBLISHED.*

26,244 of 1905.—EVERED & Co., LTD., and S. BAKER: *Stop for Sliding Window Sashes.*

This relates to a stop for limiting the extent of the opening of the sliding sashes of windows, the said stop consisting essentially of a bolt or rod passing through a plain or screw swivelling eye carried by a horizontal pivot secured to the fixed frame of the window above the meeting rail of the bottom sliding sash and a socket fixed to the top sliding sash above the meeting rail of the bottom sliding sash, and a socket fixed to the top sliding sash above the meeting rail of the same, with which the outer end of the rod or bolt engages in its acting position, the said rod or bolt in its non-acting position depending vertically at the side of the window-frame.

26,432 of 1905.—S. TAYLOR: *Metal-covered Roofs, Walls, and Buildings.*

This relates to metal-covered roofs, walls, and buildings, in which the opposed edges of the metallic sheets are separated a short distance apart, the open joints being covered by guttered covering strips or caps giving to the opposed edges of the metallic sheet and the joint covering strips or caps such a configuration that longitudinal channels are formed between them for carrying away water of condensation or other water and preventing the same from gaining by capillary attraction or otherwise access to the undersides of the metallic sheets.

11,504 of 1905.—E. PACKHAM, A. H. BALL, and F. L. BALL: *Apparatus for Burning Bricks.*

This relates to an apparatus for burning bricks, and consists of a chamber constructed in such a manner that the bricks are burnt first on one side and then on the other, the temperature of the chamber gradually rising and the size of the flames increasing during the burning process.

15,839 of 1905.—R. BOWES: *Fireplaces.*

This relates to fireplaces, and consists in forming them with a heat-retaining fire-brick hearth arranged below the grate bars to form a chamber for heating the air supply before it passes between the bars, in combination with a raised metal bed-plate on which the fire-brick hearth is mounted to form a safety chamber for insulating

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—*Continued on page 289.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xix.; Auction Sales, xxxii. Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Contracts.

BUILDING.

SEPTEMBER 3.—**Ballycastle.**—COTTAGES.—Tenders are invited by the Ballycastle R.D.C. for the erection of the following cottages upon the several sites shown on the deposited plans in the following townlands, *i.e.*:—Double cottage in the townland of Maghernahar; ditto, Toberkeagh; ditto, Ballycleagh; ditto, Moycraig Lower; ditto, Ballypatrick; ditto, East Torr; ditto, Eglish; block of three cottages in the townland of Coolkenny; block of four cottages in the townland of Capecastle; ditto, Coolnagoppoge; ditto, Townparks; block of six cottages in the townland of Drumawillin. The deposited maps and the plans, specifications, and draft contract may be inspected in the office of Mr. Hugh M'Gill, Clerk of the Ballycastle R.D.C., Board-room, Ballycastle, from 10 o'clock a.m. to 4 o'clock p.m. each day by intending contractors. Tenders must be upon the prescribed form, and must be sealed and addressed to the Presiding Chairman, Ballycastle R.D.C., and marked "Tender for Cottages," and must be received by the Clerk not later than 3 o'clock p.m. on September 3. Messrs. P. & J. Boyle, Solicitors for the Ballycastle R.D.C., Ballymoney.

SEPTEMBER 3.—**Bradford.**—OFFICE.—Manchester Paving, etc., Committee invite tenders for the erection of a small office at Butterworth-street Yard, Bradford. Drawings may be seen, and specification and bill of quantities obtained, at the office of the City Architect, Town Hall, upon payment of 1*l.* 1s. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 5 p.m., September 3.

SEPTEMBER 3.—**Canterbury.**—ALTERATIONS.—Canterbury Rate and Finance Committee invite tenders for proposed alterations at the Municipal Offices in Guildhall-street. Particulars of the work may be obtained at the offices of Mr. Arthur C. Turley, A.M.Inst.C.E., City Surveyor, City Surveyor's Office, Canterbury. Sealed tenders for the work must be forwarded to the Town Clerk, Burgate-street, by 5 p.m. on September 3.

SEPTEMBER 4.—**Ballinderry.**—ADDITIONS.—For alteration and additions to Oatlands, Ballinderry, according to the plans, specification, and conditions of contract, to be seen at office of Mr. William J. Fennell, architect, 2, Wellington-place, Belfast. Tenders to be sent to architect before 12 o'clock on September 4. Bills of quantities can be had from Messrs. M'Carthy & Brookes, surveyors, Scottish Provident Buildings.

SEPTEMBER 4.—**Blackrock.**—PLATFORM.—Blackrock U.D.C. invite tenders for the erection of a platform in the Assembly Room, Town Hall. Plans and specifications can be seen at the Surveyor's Office, Town Hall, Blackrock. Tenders (which are to be on prescribed forms and accompanied by schedule of prices) must be lodged with Mr. R. Finlay Heron, Town Clerk, Town Hall, Blackrock, Co. Dublin, on or before 4 o'clock p.m. on September 4.

SEPTEMBER 4.—**Chesterfield.**—SCHOOL WORKS, ETC.—Chesterfield Guardians invite tenders for alterations and repairs at their Union Schools, Ashgate-road, viz.:—(*a*) Joiners' work; (*b*) asphalting; (*c*) provision of glazed-tile dado for corridors. Specifications can be seen, and all information obtained, at the office of Mr. W. H. Waggstaffe, architect and surveyor, 57, Salter-gate, Chesterfield, who will supply forms of tender. Sealed tenders, on the prescribed forms, must reach Mr. R. F. Hartwright, Clerk to the Guardians, Union Offices, Chesterfield, not later than the first post on September 4.

SEPTEMBER 4.—**Durham.**—SCHOOL WORKS.—Durham County Education Authority invite sole tenders for alterations to the following schools:—Wingate, Wingate Grange, the Station Town. Quantities may be obtained on application to the Architect, Mr. W. Rushworth, F.R.I.B.A., County Education Offices, Shire Hall, Durham. Plans, specifications, and conditions of contract may be seen at the respective schools or at office of Architect. Sealed and endorsed tenders are to be delivered to the Architect not later than 5 p.m. on September 4.

SEPTEMBER 4.—**Sandown.**—ALTERATIONS, ETC., TO TOWN HALL.—The Sandown U.D.C. invite tenders for alterations and additions to the Town Hall. Plan and specification may be seen at the office of the Surveyor, Town Hall, Sandown, between the hours of 9.30 and 10 a.m. and 2.30 and 3 p.m. Tenders, endorsed "Town Hall Alterations," must be sent to Mr. William H. Wooldridge, Clerk to the Council, Town Hall, Sandown, not later than 12 noon on September 4.

SEPTEMBER 5.—**Chevington.**—HALL.—Chevington (Northumberland) Parish Hall, etc. Mr. Arthur B. Plummer, F.R.I.B.A., M.R.San.I., the Diocesan Architect, 13, Grey-street, Newcastle-on-Tyne, Names to be sent in before September 5.

SEPTEMBER 5-17.—**Gainsborough.**—PULLING DOWN AND REBUILDING PREMISES.—Pulling down and rebuilding premises in Bridge-street, Gainsborough, belonging to the Gainsborough Industrial Co-operative Society, Ltd. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street Chambers, Lincoln, on or before September 5, and on payment of 2*l.* 2s. The drawings and conditions of contract may be inspected at the offices of the architects. Tenders must be delivered to the Manager, Mr. G. Wright, 11, Bridge-street, Gainsborough, at the office of the Society, and in the envelope provided for that purpose, before 10 a.m. on September 17.

SEPTEMBER 5.—**Llandyfriog.**—HOUSE.—For building a house at Llandyfriog, near Newcastle Emlyn. Plans and specification can be seen, and bills of quantities obtained from either Mr. J. D. Roy Evans, solicitor, Newcastle Emlyn, or from Mr. J. Coates Carter, architect, Bank Buildings, St. Mary-street, Cardiff. Tenders to be in by September 5.

SEPTEMBER 5.—**Lurgan.**—INDUSTRIAL SCHOOL.—New industrial schools, dormitories, etc., in connexion with the Convent of Mercy, Lurgan, for the Rev. Mother Superioress, according to the plans and specification prepared by Messrs. Ashlin & Coleman, architects, 7, Dawson-street, Dublin. Bills of quantities have been prepared by Mr. D. W. Morris, surveyor, 68, Harcourt-street, and can be obtained from him on payment of 1*l.* 1s. Plans and specification can be inspected at the architects' office, and at the Convent of Mercy, Lurgan. Sealed tenders, addressed to the architects, to be delivered at their offices not later than 12 o'clock on September 5.

SEPTEMBER 5-25.—**Newbiggin.**—SCHOOL.—Northumberland Education Committee invites tenders for the work of erecting a new Council school, to accommodate 200 scholars, at Newbiggin-by-the-Sea. Name and address to Mr. C. Williams, Secretary to the Education Committee, Pearl Buildings, Newcastle-on-Tyne, not later than September 5, together with a deposit of 2*l.* 2s. Plans of the work may be inspected at the Committee's Offices, and tenders, endorsed "Tender for Newbiggin New School," must be forwarded not later than September 25.

* SEPTEMBER 5.—**New Southgate.**—NEW CHURCH, ETC.—The Trustees of the Springfield-road Primitive Methodist Chapel, New Southgate, invite tenders for taking down existing temporary church and re-erecting on another portion of the site; also for the erection of new church premises. Builders to send their names, with references and list of works executed by them, to Mr. Frank Bethell, architect, 23, Queen Anne's-place, Bush Hill Park, Enfield, N., on or before September 5.

SEPTEMBER 5.—**Penrhiwceiber.**—COTTAGES.—For the erection of forty cottages at Penrhiwceiber for the Cynon Cottage Company, Ltd. Sealed endorsed tenders to be delivered to the Secretary, Mr. J. H. Richards, Miskin-terrace, Mountain Ash, on or before September 5. Plans and specification may be inspected at the office of M. T. W. Millar, architect and surveyor, Mountain Ash.

* SEPTEMBER 7.—**Stockport.**—STABLES, ETC.—The Guardians of the Stockport Union invite tenders for stables and coach-house, etc., at the Stepping Hill Hospital, Hazel-grove, near Stockport, in accordance with plans and specification, etc., prepared by Mr. W. H. Ward, architect, Paradise-street, Birmingham. Plans and specification may be seen at the Union Offices, Stockport, or upon application to Mr. Ward. Forms of tender, with copies of bills of quantities, will be sent to contractors upon application to Mr C. F. Johnson, Clerk to the Guardians, Union Offices, Stockport, enclosing cheque for 2*l.* 2s. Sealed tenders to be sent to Mr. Johnson before 10 a.m., September 7.

SEPTEMBER 8.—**Belfast.**—FACTORY.—Building factory on Mountpottinger-road, for Mr. William Hume, according to the plans, specification, and conditions of contract, to be seen at offices of Messrs. D. M. Cooper & R. Sharpe Hill, architects, 35, Wellington-place, Belfast. Bills of quantities can be obtained from Messrs. M'Carthy & Brookes, surveyors, Scottish Provident Buildings. Tenders to be sent to architects on or before September 8.

SEPTEMBER 8.—**Coventry.**—ELECTRIC-LIGHT SUBSTATION.—Coventry Electric Light Committee invites tenders for the works required to be executed and materials supplied in the erection of a substation and boiler seatings at the Electricity Works, Sandy-lane. Drawings, general conditions, and specification may be inspected, and bills of quantities obtained, on payment of 1*l.* 1s. to the City Treasurer, on application at the office of Mr. J. E. Swindlehurst, City Engineer and Surveyor, St. Mary's Hall, Coventry. Sealed tenders, endorsed "Tender for Electric Light Substation, etc.," to be delivered to the Office of the Town Clerk, 10, Hay-lane, not later than September 8.

SEPTEMBER 8.—**Glyn-Neath, etc.**—POLICE BUILDINGS.—Glamorgan Quarter Sessions and C.C. Standing Joint Committee invite tenders for (1) new police-station at Glyn-Neath; (2) alterations and additions at the Bridgend Police-court Buildings. Plans and specifications of the respective works may be seen, and copies of the bills of quantities obtained, at the following places:—Work No. 1, at the County Police-station, Neath; work No. 2, at the County Police-station, Bridgend; and for each of the works at these offices. Sealed tenders are to be delivered to Mr. T. Mansel Franklen, Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff, together with the full names and addresses of two substantial sureties, not later than September 8, marked outside "Tender for Glyn-Neath Police-station," or "Tender for Alterations to Bridgend Police-court Buildings."

SEPTEMBER 8.—**Kea.**—STABLE.—The erection of a stable at Calenick Farm, in the Parish of Kea, in the occupation of the Executors of Mr. Thomas Thomas. Plans, conditions, and specifications are now at the farmhouse at Calenick. Tenders should be sent on or before September 8 to Mr. George Gow, Tregothnan Office, Truro.

SEPTEMBER 8.—**Reigate.**—SHEDS, ETC.—Reigate Town Council invites tenders for the erection of cart sheds and a store at the Corporation depôts in Brighton-road, Redhill, London-road, and Blackborough-road, Reigate, all in the said borough, in accordance with plans, sections, general conditions, and specification prepared by Mr. F. T. Clayton, C.E., the Borough Surveyor, which may be seen, and full particulars obtained, at his office at the Municipal-buildings, Reigate. Sealed tenders, on forms which will be provided on application, giving the names and addresses of two sureties, are to be delivered at office of Mr. Alfred Smith, Town Clerk, at the Municipal-buildings aforesaid, endorsed "Tender for Cart Sheds," not later than noon of September 8.

SEPTEMBER 10.—**Alnwick.**—CO-OPERATIVE PREMISES.—The Amble Co-operative Society, Ltd., invite tenders for the erection of branch premises at Alnwick. Quantities can be obtained upon application to Mr. E. G. E. Kino, architect, Co-operative Wholesale Society, West Blandford-street, Newcastle-on-Tyne. Tenders, endorsed Alnwick New Building, will be received at the Society Office, Queen-street, Amble, up to 12 o'clock noon, September 10.

SEPTEMBER 10.—**Bury St. Edmund's.**—SCHOOL ALTERATIONS, ETC.—The West Suffolk Education Committee invite tenders for alterations and additions to the County School, Northgate-street, Bury St. Edmund's. Plans and specification can be seen at the Education Offices, 5, Crown-street, Bury St. Edmund's, or at the offices of the County Architect (Mr. A. Ainsworth Hunt, Sudbury and Bury St. Edmund's). Tenders (sealed and endorsed) to be delivered to Mr. Fred. R. Hughes, Secretary to the Education Committee, 5, Crown-street, Bury St. Edmund's, on or before September 10.

SEPTEMBER 10.—**Dublin.**—WORKMEN'S DWELLINGS.—Dublin Improvements Committee invite tenders for the erection of workmen's dwellings in Townsend-street, in accordance with the plans, specification, and conditions of contract prepared by the City Architect, which may be inspected daily (except Saturdays) at Municipal Buildings, Cork Hill, Dublin, between the hours of 11 a.m. and 4 p.m. Copies of bills of quantities and form of tender may be obtained from the City Treasurer, Municipal Buildings, Cork Hill, Dublin, on payment of 2*l.* (two pounds). Tenders must be accompanied by the priced bills of quantities (priced in ink), and must also contain the names of two solvent sureties willing to be bound severally with the contractor for the due performance of the contract in a sum of one-fifth of the amount of the contract price. Tenders, under seal, addressed to the "Chairman Improvements Committee," and endorsed "Tenders for the Erection of Dwellings in Townsend-street," to be lodged at the Improvement Committee Office, City Hall, Dublin, not later than 4 o'clock on September 10.

SEPTEMBER 10.—**Senghenydd.**—CHAPEL HOUSE.—A chapel house for the Trustees of the Calvinistic Methodist Church, Senghenydd. Plans and specifications may be seen with Mr. John Davies, butcher, Caerphilly-road, Senghenydd. Sealed tenders, endorsed "Chapel House," to be delivered to Mr. John Davies not later than September 10. Mr. R. S. Griffiths, architect and surveyor, Tonypandy.

* SEPTEMBER 11.—**Upper Edmonton.**—NEW ROOF.—The Guardians of the Strand Union invite tenders for works at their Workhouse, Upper Edmonton, viz.:—(1) General exterior repairs, cleaning, painting, etc.; (2) (*a*) repairs to roof of laundry building, and alternately; (*b*) construction of new roof altogether. Plans and specifications may be inspected at the offices of the architect, Mr. A. A. Kekwich, 18 and 19, the Outer Temple, Strand, before 11 and 4 (Saturdays excepted), or at the Workhouse at Edmonton. Separate tenders, sealed and endorsed "General Repairs, Edmonton," "Repairs to Laundry Roof," or "New Roof to Laundry," as the case may be, are to be delivered at 15, Henrietta-street, Covent Garden, W.C., by 4 p.m., September 11.

SEPTEMBER 12.—**York.**—ALTERATIONS TO LIBRARY.—Alterations at the Public Library, and for supplying and fixing of furniture and fittings. Drawings may be seen, and specification, schedules, and form of tender may be obtained, at office of Mr. A. Creer, City Engineer, Guildhall, York, on deposit of 1*l.* 1s. Tenders, endorsed "Library Additions," to be delivered not later than noon on September 12.

SEPTEMBER 14.—**Halifax.**—DWELLING-HOUSES.—The various works required to be done in erecting eleven dwelling-houses and appurtenances in Leamington-avenue (Clapton Lodge Estate), Halifax. Plans and specifications may be seen, and further particulars obtained, at offices of Mr. Medley Hall, architect, 1, Harrison-road, Halifax, from September 8 to September 14, on which last-named day tenders must be delivered to architect, and endorsed "Tender for Dwelling-houses."

SEPTEMBER 14.—**Harthill-with-Woodall.**—CLOAK-ROOM.—The West Riding Education Committee invite tenders for the erection of a new cloak-room at Harthill-with-Woodall Provided School. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers Edwards, County Archi-

tect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect not later than 10.30 on the morning of September 14.

SEPTEMBER 14.—**West Riding.**—SCHOOLS.—The West Riding Education Committee invite whole or separate tenders in connexion with the following schools:—Thornton-in-Craven New School; Elslack New School; Cudworth New School; Kirkhamgate New School; Bolton-on-Dearne: Goldthorpe (infants) New School; Bolton-on-Dearne (enlargement)—builder, joiner, slater, plumber, plasterer, painter. Mytholmroyd: Provided School (sanitary alterations); Scout-road Provided School (sanitary alterations); Mytholmroyd: Burnley-road Provided School (sanitary alterations)—builder, joiner, slater, plumber, painter. Mytholmroyd: Cragg Vale Provided School (sanitary alterations), builder and plumber, Hartshill-with-Woodall Provided School (alterations and new cloak-room), builder, etc.; Adwick-on-Dearne Provided School (alterations and repairs), builder and asphalter. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques to be sent to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be sent to the Architect not later than 10.30 on the morning of September 14.

SEPTEMBER 15.—**Isleworth.**—SCHOOL.—Heston and Isleworth Urban District Education Committee invite tenders for the erection of a new infants' school at Spring Grove, to accommodate 350 children. The plans may be inspected at the office of Mr. A. Lancelot Lang, Architect, Council House, Hounslow, where also bills of quantities may be obtained, together with specification and form of tender, on payment of a deposit of 2*l.* 2*s.* Tenders, on the form supplied, to be delivered to Mr. H. J. Baker, Clerk to the Committee, Council House, Hounslow, not later than 12 noon on September 15, endorsed "Tender for Spring Grove Infants' School."

* SEPTEMBER 19.—**Chapeltown, Leeds.**—ENLARGEMENT OF POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for enlargement of the Branch Post-office, Chapeltown, Leeds. Drawings, specification, and copy of the conditions and form of contract may be seen on application to the **Postmaster**. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, etc., Storey's-gate, S.W., on payment of 1*l.* 1*s.* Tenders must be delivered before 12 noon, September 19, addressed to the Secretary, H.M. Office of Works, etc., Storey's-gate, S.W., and endorsed "Tender for Enlargement, Chapeltown Branch Post-office, Leeds."

NO DATE.—**Bristol.**—WAREHOUSE.—New warehouses upon the Bath-road, Bristol. Quantities obtained, and plans and specifications inspected, upon application to Messrs. John Harding & Son, architects and surveyors, Salisbury.

NO DATE.—**Chesterfield.**—COTTAGES.—Four new cottages and two shops, Durrant-road, Chesterfield. Plans and bills of quantities and all further information at the offices of Mr. W. Cecil Jackson, M.S.A., architect and surveyor, 29, Knifesmith Gate, Chesterfield.

NO DATE.—**Chipping Norton.**—SHED.—Weaving shed (part of a larger scheme). Estimate and specification required at once for shed, 110 ft. by 70 ft., five 14 ft. bays, floor to joists 12 ft., concrete floor. Address Messrs. Wm. Bliss & Son, Ltd., Woollen Manufacturers, Chipping Norton.

NO DATE.—**Leeds.**—SCULLERY HOUSES.—The various trades in the erection of six scullery houses on White Horse Estate, York-road. For plans, etc., apply Mr. T. Hall, builder, 3, Hanover-place, Park-lane, Leeds.

NO DATE.—**Llanon.**—OFFICES, ETC.—New offices and other work at Llanon Council School. Full particulars can be obtained on application to the Headmaster, or to Mr. Geo. Dickens-Lewis, County Architect, Aberystwyth.

NO DATE.—**Pannal.**—HOUSE.—The erection and completion of a new house, Hill Foot, Pannal, for Mr. A. Rushworth. Names to Mr. Richard Crosland, architect, 10, James-street, Harrogate. Quantities will be forwarded when ready.

NO DATE.—**Swadlincote.**—FREE LIBRARY.—Swadlincote U.D.C. invite tenders for the erection of a free library at Swadlincote. Plans and specifications may be seen, and quantities and particulars obtained, at the office of the architect, Mr. A. Macpherson, 16, Tenant-street, Derby, on payment of a deposit of 2*l.* 2*s.*

NO DATE.—**Swansea.**—REBUILDING HOTEL.—For the rebuilding of the White Hart Hotel, Oxford-street and Union-street, Swansea. Names for bills of quantities to Mr. John H. Morewood, architect, Welwyn Lodge, Mackworth-terrace, Swansea.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 4.—**Isleworth.**—BRIDGE.—Heston and Isleworth U.D.C. invite tenders for the following works:—(*a*) The reconstruction of Oak Bridge, Isleworth; (*b*) the reconstruction of Queen's Bridge, Isleworth. The drawings and specification can be seen at the office of the Acting Engineer and Surveyor to the Council, Council House, Hounslow, and forms of tender may be obtained on payment of a deposit of 1*l.* 1*s.* for each contract. Sealed tenders, endorsed "Oak Bridge Reconstruction," or "Queen's Bridge Reconstruction," as the case may be, to be delivered to Mr. H. J. Baker, Clerk to the Council, Council House, Hounslow, W., not later than 12 noon on September 4.

SEPTEMBER 5.—**London.**—PIG IRON.—The East Indian Railway Company invite tenders for the supply and delivery of pig iron (Calder No. 1, Gartsherrie No. 4, Lilleshall cold blast No. 2, and Madeley Wood cold blast), as per specification to be seen at the Company's Offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Pig Iron," not later than 12 o'clock noon on September 5. For each specification a fee of 1*l.* 1*s.* is charged, which cannot, under any circumstances, be returned.

SEPTEMBER 7.—**Newcastle-on-Tyne.**—BOILERS, HEATING, ETC.—Newcastle upon-Tyne Sanitary Committee invite tenders for boilers, laundry fittings, heating, etc., required in the extensions to the City Hospital for Infectious Diseases, Walker Gate. Plans may be seen, and specifications, bills of quantities, and forms of tender obtained, at the City Property Surveyor's Department, Town Hall, Newcastle-upon-Tyne, on payment of 1*l.* 1*s.* to the City Treasurer. Sealed tenders, addressed to the "City Property Surveyor," and endorsed "Tender for Boilers, Heating, etc., at City Hospital," must be delivered at his office, Town Hall, before 10 a.m. on September 7.

SEPTEMBER 8.—**London.**—UNDERFRAMES.—The Board of Directors of the Bengal-Nagpur Railway Company, Ltd., invite tenders for underframes for carriages. Specifications and forms of tender can be obtained at the Company's Office, 132, Gresham House, Old Broad-street, E.C. For each specification a fee is charged, which will not be returned. Tenders to be delivered not later than noon on September 8. Mr. Robert Miller, Managing Director.

* SEPTEMBER 13.—**Ladywell, S.E.**—IRON BRIDGES.—Guardians of Bermondsey invite tenders for provision and erection of iron bridges connecting A and E Block at the Workhouse, Ladywell, S.E. Specification and form of tender can be obtained from the Clerk to the Guardians, 283, Tooley-street, S.E., between 10 and 12, from September 3 to 6, on deposit of 5*l.* Tenders, endorsed "Tender for Bridges, Ladywell Workhouse," to be delivered to Mr. E. Pitts Fenton, as above, not later than 6.30 p.m., September 13.

SEPTEMBER 17.—**Hull.**—SIDINGS.—North-Eastern Railway Directors invite tenders for the diversion of the passenger lines for a distance of about one mile, and the construction of a group of marshalling sidings at Dairycoates, Hull. Plans may be seen, and specification, detailed quantities, and form of tender obtained, on personal application at the office of Mr. W. J. Cudworth, the Company's Engineer at York. Sealed tenders, marked "Tender for Dairycoates New Sidings," to be sent to the Secretary at York not later than noon on September 17.

SEPTEMBER 17.—**Oxford.**—TRAMWAYS.—Oxford Corporation invite tenders for the reconstruction, extension, and electrical equipment of the existing horse tramways in the city and the leasing thereof. Proposals based upon the overhead system of electric tramways will not be considered. The conditions of tender may be obtained from Mr. Richard Bacon, Town Clerk, Town Hall, Oxford, on deposit of Bank of England notes to the value of 100*l.* Tenders must be addressed to the Town Clerk, in sealed packets, endorsed "Tender of Tramways," and delivered at his office in the Town Hall, Oxford, on or before September 17.

SEPTEMBER 19.—**Rotherham.**—MACHINERY FOR BATHS.—Rotherham Corporation invite tenders for laundry machinery and fittings required at the Public Baths, also from builders for structural alterations. Plans and specifications may be seen, and further particulars obtained, by applying at the offices of Mr. J. Platts, Corporation Architect. Tenders, endorsed "Laundry Machinery for Baths," to be sent to Mr. W. J. Board, Town Clerk, Town Hall, Rotherham, not later than September 19.

NO DATE.—**Altrincham.**—BRIDGE WIDENING.—Altrincham U.D.C. invite tenders from contractors for the widening of the Broadheath Bridge. Copies of quantities may be obtained from the engineers, Messrs. Maxwell & Tuke, 25, Brazenose-street, Manchester, and plans may be inspected either at their offices or at the offices of the U.D.C. at Altrincham.

MISCELLANEOUS.

SEPTEMBER 1.—**Norwich.**—TARRING.—Tenders will be received, not later than September 1, for externally tarring the whole of the galvanised iron roofing, and painting, with two coats of good oil paint, all the outside woodwork in the roof of the works. The tar and paint only will be supplied to the contractors. Inspection can be made on site. Messrs. Laurence, Scott, & Co., Ltd., Gothic Works, Norwich.

SEPTEMBER 4.—**Leyton.**—SCAVENGING.—Leyton U.D.C. invite tenders for the collection of house refuse by the pail system from houses within their district for the year ending September 30, 1907, or the six months ending March 31, 1907, at the option of the Council. Forms of tender and further particulars can be obtained of Mr. William Dawson, M.Inst.C.E., the Council's Surveyor, Town Hall, Leyton, between the hours of 10 and 4 (Saturdays, 10 and 12). Tenders, on printed forms in sealed envelopes, endorsed "Tender for Collection of House Refuse," must be delivered at a meeting of the Council, to be held on September 4, at 7 o'clock p.m.

SEPTEMBER 4.—**Maidstone.**—FENCING.—Maidstone Corporation invite tenders for the erection of iron fencing, etc., round the Cattle Market in the Fairmeadow, Maidstone, specification and particulars of which may be obtained at the Office of the Borough Surveyor, Fairmeadow, Maidstone. Tenders, endorsed "Tender for Fencing," to be sent to Mr. T. F. Bunting, Borough Surveyor, Maidstone, not later than September 4.

SEPTEMBER 5.—**Stoke-upon-Trent.**—ELECTRIC WIRING.—Stoke-upon-Trent Guardians invite tenders for the electric wiring of a portion of the Workhouse premises, comprising the new administrative block, etc., in accordance with the specification and schedule prepared by Messrs. Edwards & Shaw, consulting engineers, including underground mains, fittings, and other appliances necessary to complete the whole of the work to be carried out. A copy of the specification and schedule may be obtained on application at offices of Mr. C. Daniel, Clerk to the Guardians, Union Offices, Stoke-upon-Trent, where the reference plan is deposited and may be inspected. The buildings at the Workhouse may be seen on application to the Master, on any day but Saturday between 10 and 4 o'clock. Tenders, marked "Electric Wiring," to be sent to Clerk not later than 9 o'clock in the morning of September 5.

SEPTEMBER 6.—**Blaydon.**—SCAVENGING.—Blaydon U.D.C. invite tenders for the removal and disposal of scuttle ashes, contents of ashpits, house refuse, etc., at Victoria Garesfield. Specification, etc., may be obtained from Mr. Robert Biggins, Sanitary Inspector, at the Offices of the Council, Blaydon-on-Tyne, between the hours of 9 and 10 a.m. Sealed tenders, endorsed "Tender for Scavenging Contract," are to be delivered to Mr. Henry Dalton, Clerk, Blaydon-on-Tyne, before noon on September 6.

SEPTEMBER 6.—**Downpatrick.**—WELL BORING.—For boring a 4-in. diameter hole in a well in the grounds of Down District Lunatic Asylum, Downpatrick. Quotations in accordance with specification, which may be seen at the Asylum, to be lodged with the Resident Medical Superintendent on or before September 6, at 12 o'clock.

SEPTEMBER 6.—**Manchester.**—CABLES, ETC.—Manchester Electricity Committee invite tenders for the supply of the following, viz.:—(*a*) Three 1,250 k.w. rotary convertors; (*b*) high and low tension cables. Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester. Sealed tenders, enclosed in the official envelope, and addressed to the Chairman of the Electricity Committee, Town Hall, must be sent in not later than 10 a.m. on September 6.

SEPTEMBER 8.—**Carmavey.**—CONCRETE WALK.—The Committee of Carmavey Graveyard invite tenders for the making of a concrete walk and edgings. Specification and plan can be seen at the caretaker's house. Tenders will be received up to September 8, 1906, by Mr. W. P. Dickie, Secretary, Ballysculty, Muckamore, Ireland.

SEPTEMBER 10.—**Ryton.**—CARTING.—The Ryton U.D.C. invite tenders for the cartage of road metal from Blaydon Station, Wylam Station, Addison Colliery Siding, or Clara Vale Colliery Siding to the different parts of their district, where it may be required during the year ending September 11, 1907. Particulars may be obtained on application to Mr. John P. Dalton, surveyor, Ryton-on-Tyne, to whom tenders must be delivered before noon on September 10.

SEPTEMBER 11.—**Rhondda.**—SCAVENGING.—Rhondda U.D.C. invite tenders for the scavenging of their district, in sections, for the term of one year. Specification and form of tender may be obtained at the Surveyor's Department, Public Offices, Pentre, Rhondda. All tenders must be delivered under seal by 10 a.m. on September 11, addressed to the Chairman of the said Council, and endorsed "Tender for Scavenging."

SEPTEMBER 12.—**Rathmines.**—ELECTRICITY SUPPLY.—The Council of the Urban District of Rathmines (Ireland) invite tenders for the following:—Sect. A, electricity supply mains; sect. B, house fuse boxes; sect. C, house meters; sect. D, extension of switchboard; sect. E, extension of accumulators; sect. F, battery booster. General conditions, specification, drawings, and forms of tender may be inspected at the offices of Messrs. Robert Hammond & Son, the Consulting Engineers to the Council, 64, Victoria-street, Westminster, S.W., and may be obtained from them on making a deposit of 5*l.* Extra copies of the specification may be obtained by *bond-fide* tenderers at a charge of 5*s.* per copy, which sum will not be refunded. Tenders (sealed and marked "Tender for Electricity Works") must be addressed to Mr. F. P. Fawcett, Clerk of the Council, Town Hall, Rathmines, Co. Dublin, and be delivered not later than 10 a.m., September 12.

SEPTEMBER 14.—**Egypt.**—ROPE, ETC.—Tenders are required by the Egyptian War Department for rope, coil, 19,500 fathoms; rope, hemp, 89,100 fathoms; rope, cotton, 39,600 fathoms; galv. mild steel sheets, 300. Tender forms and specifications may be obtained from Lieut.-Col. J. H. Western, Queen Anne's Chambers, Westminster, and are returnable to him by September 14, and to remain open for thirty days from that date.

SEPTEMBER 15.—**Aylesbury.**—SCAVENGING.—Aylesbury R.D.C. invite tenders from persons willing to clean out and collect the refuse from the earth closets, privies, ashpits, and cesspools, and other house refuse, for the following parishes: No. 1, Aston Clinton; No. 2, Weston Turville; No. 3, Lower Buckland and Buckland Wharf, for the half-year ending March 31, 1907, such refuse to be collected each week, and to become the property of the contractor. A proper scavenging cart or carts must be provided by the contractor. Tenders must be made for one or more of the above-mentioned parishes, and the price for each parish must be separately mentioned. Persons desirous of tendering must apply to Mr. W. E. Stanley, Inspector of Nuisances, Stocklake, Aylesbury, at whose office the form of contract which will have to be entered into may be inspected. Tenders are to be forwarded to Mr. F. B. Parrott, Clerk, Aylesbury, at office in Bourbon-street, on or before 12 o'clock at noon, on September 15.

NO DATE.—**Middlesmoor.**—HEATING CHURCH.—For heating Middlesmoor Parish Church. For particulars apply Vicar, Middlesmoor, Patley Bridge.

PAINTING, etc.

SEPTEMBER 1.—**Bournemouth.**—PAINTING.—The Bournemouth Town Council invite tenders for painting the pavilions, cottage, and fences in parks and pleasure grounds, and other works in connexion therewith. Full particulars, forms of tender, and specification can be obtained of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1*l.* 1*s.* has been previously deposited. Tenders to be sent in, in envelopes furnished for the purpose, to the Town Clerk (Mr. Geo. Wm. Bailey), before 10 a.m., September 1.

SEPTEMBER 3.—**Carlisle.**—PAINTING.—Carlisle Guardians invite tenders for the painting of the outside wood and iron work at Harraby Hill House. Specification of work required to be done may be seen at 7, Victoria-place, Carlisle, between the hours of 10 a.m and 5 p.m. Tenders, endorsed "Harraby Hill Painting," to be left at 7, Victoria-place, not later than noon on September 3. Mr. H. B. Lonsdale, Clerk.

SEPTEMBER 3.—**Sculcoates.**—PAINTING.—Sculcoates Guardians invite tenders for painting, etc., at the relief station, Fern-street, Hull. Forms of tender and all particulars can be obtained, or will be sent by post, on application to Mr. J. H. Wild, solicitor, Clerk to the Guardians, Union Offices, Harley-street.

Hull. Tenders must be sent to the Clerk not later than 10 o'clock a.m. on September 3.

SEPTEMBER 4.—**Leeds.**—WHITEWASHING, ETC.—For whitewashing, distempering, and painting the Kingston Unity Club, Union-street, Leeds. Specifications may be seen any night from 7 to 9 o'clock. Tenders to be in not later than September 4, addressed to the Secretary, Mr. S. Scott.

SEPTEMBER 5.—**Cannock.**—PAINTING.—Cannock Guardians invite tenders for painting the whole of the outside wood, iron, and stone work of the workhouse buildings and fences. Specifications and form of tender may be obtained from Mr. Herbert M. Whitehead, Engineer's Office, Penkridge, Stafford. Tenders, endorsed "Painting of Workhouse," must reach Mr. A. W. Carver, Clerk to the Guardians, Union Offices, Cannock, before 4 p.m. on September 5.

SEPTEMBER 6.—**Derby.**—PAINTING.—Derby Cemeteries Committee invite tenders from local painters for the external cleaning and painting at Nottingham-road and Uttoxeter New-road Cemeteries. Specification may be seen, and particulars obtained, on application at office of Mr. John Ward, M.Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Babington-lane, Derby. Tenders, endorsed "Painting at Cemeteries," to be sent to Mr. Ward not later than noon on September 6.

SEPTEMBER 6.—**Lee.**—PAINTING.—Greenwich Guardians invite sealed tenders for painting the outside of the water tank at Grove Park Workhouse, Lee, S.E. Specification and form of tender can be obtained at the Clerk's Office, Union Workhouse, East Greenwich, and must be returned before September 6.

SEPTEMBER 8.—**Cardiff.**—PAINTING.—Cardiff Guardians invite tenders for external painting at Headquarters Homes, Ely, according to specification, a copy of which, together with forms of tender, may be obtained from Mr. Arthur J. Harris, Clerk, Union Offices, Queen's-chambers, Cardiff. Forms of tender, with specification attached, must be returned to Clerk under cover, endorsed "Tender for External Painting, Ely," not later than 10 a.m. on September 8.

* SEPTEMBER 9.—**Essex.**—FLOOR POLISHING.—Guardians of Poplar Union invite tenders for staining and polishing floors of day-rooms and dormitories at new schools at Hutton, Essex, between 5,000 ft. and 6,000 ft. super. Quotations at per square yard to be sent not later than 6.30 p.m. on September 19.

SEPTEMBER 11.—**Shrewsbury.**—PAINTING.—Shrewsbury Markets Committee invite tenders from persons willing to paint, etc., the exterior iron and wood work, etc., of the general market, corn exchange, arcade tower, and the roofs over Claremont-street, etc. Specification may be seen, and printed form of tender obtained, at the office of Mr. W. Chapple Eddowes, Borough Surveyor, Borough Surveyor's office, The Square, on payment of 1*l.* Sealed tenders, addressed to the Town Clerk, Guildhall, to be delivered on or before September 11.

SEPTEMBER 14.—**Bournemouth.**—PAINTING, ETC.—Bournemouth Town Council invite tenders as follows:—(1) Repairing, painting, etc., to cottages at the Sanitary Hospital; (2) for cleaning and decorating, etc., to interior of the Bournemouth and Boscombe police stations. Forms of tenders and specifications can be obtained of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1*l.* 1s. has been previously deposited. Tenders to be sent in, in envelopes furnished for the purpose, to the Town Clerk (Mr. Geo. Wm. Bailey) before noon of September 14.

SEPTEMBER 29.—**Branksome.**—PAINTING.—For cleaning and painting police-station. Specifications, prepared by the County Surveyor, can be seen at the station. Tenders to be sent to Mr. E. Archdall Ffooks, Sherborne, on or before September 29.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 3.—**Ballyclare.**—FOOTPATHS.—Ballyclare U.D.C. invite tenders for the construction of three footpaths in the town of Ballyclare. Specifications can be inspected at office of Mr. Edward Hill, Clerk to the Council, between the hours of 11 o'clock a.m. and 4 o'clock p.m., on payment of a deposit fee of 1*l.* Tenders, on the forms supplied, must be sent by post, addressed "Clerk of U.D.C., Ballyclare," marked "Tender" on the outside, and bearing the number of the work tendered for, so as to be received by the Clerk not later than 5 o'clock p.m. on September 3.

SEPTEMBER 3.—**Stretford.**—STREET WORKS.—Stretford U.D.C. invite tenders for paving, etc., in the following streets and passages, viz.:—(*a*) Trafford Park-road; (*b*) Wilson-street; (*c*) Nansen-street; (*d*) Passage, 29-81, Jackson-street, and 23-37, Pinnington-lane; (*e*) Passage, 48-84, Victoria-road. The drawings and specification may be seen, and form of tender with schedule of quantities and other particulars, obtained on application to Mr. Ernest Worrall, the Council's Surveyor, any day during office hours, on payment of a deposit by cheque of 2*l.* 2s. Sealed tenders, endorsed "Private Streets Works," addressed to the Chairman of Highways, are due at the Council Offices by 12 o'clock noon on September 3.

SEPTEMBER 4.—**Beverley.**—SEWERAGE WORKS.—The Beverley R.D.C. invite tenders for the construction of a main sewer in Molescroft and along the highway leading to Beverley, together with all necessary manholes, flushing apparatus, lampeyes, and other incidental works. Plans, sections, and specifications may be seen, and quantities obtained, upon application to the Engineer, Mr. E. Picker, at the Council Offices, 12, Newbegin, Beverley, between the hours of 10 a.m. and 1 p.m. Sealed and endorsed tenders, addressed to Mr. F. G. Hobson, Clerk to the Council, Newbegin, Beverley, and delivered not later than 9 a.m. on September 4.

SEPTEMBER 4.—**Tynemouth.**—STREET WORKS.—Tynemouth Corporation invite tenders for executing the following street works:—(1) Laying tar-macadam, etc., in Beverley-gardens, Cullercoats; (2) laying tar-macadam, etc., in Drummond-terrace, North Shields. Plans and specifications may be seen at the office of Mr. John F. Smillie, Borough Surveyor, to whom sealed and endorsed tenders are to be sent not later than 12 noon on September 4.

SEPTEMBER 5.—**Caerphilly.**—ROADS.—The Glamorgan C.C. invite tenders for the widening and improving of the Caerphilly and Nantgarw main road between the Piccadilly Inn, Caerphilly, and Castle Farm, and in forming a stone depôt. Plan and specification of the work may be seen, and copies of the quantities obtained, at the Police-station, Caerphilly, and at offices of Mr. T. Mansel Franklen, Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff. Sealed tenders, made out on the bill of quantities supplied, are to be delivered to the clerk, together with two substantial sureties, not later than September 5, marked outside "Tender for Caerphilly Improvement."

SEPTEMBER 5.—**Failsworth.**—PRIVATE STREET WORKS.—The Failsworth U.D.C. invite tenders for the private street improvement works required to be executed in Stott-street and William-street, Failsworth. Plans and specification may be seen, and forms of tender, with quantities, obtained at the Surveyor's office, Town Hall, Failsworth. Tenders, endorsed "Tender for Private Street Works," must be delivered to Mr. H. C. Broome, Clerk to the Council, Failsworth, not later than 12 o'clock noon on September 5.

SEPTEMBER 5.—**Failsworth.**—SEWERING.—The Failsworth U.D.C. invite tenders for the works of sewering, levelling, kerbing, paving, channelling, etc., of the following passages within the district of Failsworth, namely:—Rear of Nelson-street and Brook-street, rear of 56 to 78, Oldham-road, rear of 51 to 63, Hobson-street, rear of 1 to 9, Corn-street, rear of 6 to 14, Peel-street, rear of Peel-street and Nelson-street, rear of 90 to 112, Oldham-road (off Victoria-street). Plans and specification may be seen, and forms of tender, with quantities, obtained at the Surveyor's office, Town Hall, Failsworth. Tenders, endorsed "Tender for Private Street Works," must be delivered to Mr. H. C. Broome, Clerk to the Council, Failsworth, not later than 12 o'clock noon on September 5.

SEPTEMBER 5.—**Pinner.**—SEPTIC TANK.—The R.D.C. of Hendon invite tenders for the construction of a covered septic tank at the sewage farm, in the parish of Pinner, and other works in connexion therewith. Plans and specification of the work may be seen at the office of Mr. J. A. Webb, Engineer to the Council, Stanmore, during office hours. Sealed tenders, endorsed "Pinner Farm," to be delivered to Mr. F. J. Seabrook, Clerk to the Council, Union Offices, Edgware, not later than September 5.

SEPTEMBER 6.—**Arundel.**—STREET IMPROVEMENTS.—For kerbing, channelling, and making-up about 400 sq. yds. of Wood View-road and Ford-road, Arundel, for the Town Council. The works include about 580 yds. of Norwegian granite kerb and brick channelling. Plans and specification may be seen, and form of tender and quantities obtained, on payment of 10s. 6d., on application to Mr. E. F. Farrington, Borough Surveyor, Town Hall, Arundel. Sealed tenders, marked "Tender for Street Works," to be delivered to Mr. Arthur Holmes, Town Clerk, Arundel, not later than 5 p.m. on September 6.

SEPTEMBER 8.—**Chorlton, Manchester.**—MAKING-UP ROADS.—Manchester Corporation (Withington Committee) invite tenders for the several works required in making-up Newport-road, Chorlton-cum-Hardy; Hartley-road, Chorlton-cum-Hardy; Lynton-road, Chorlton-cum-Hardy; Chepstow-road, Chorlton-cum-Hardy; Crescent-road, Chorlton-cum-Hardy. Plans, sections, and specifications of the work can be seen, and a form of tender, with quantities, and any further information, obtained from the Surveyor to the Committee, Town Hall, West Didsbury. Tenders to be endorsed "Tenders for Street Works," and to be addressed to the Chairman of the Withington Committee, Town Hall, West Didsbury, and delivered not later than noon on September 8.

SEPTEMBER 8.—**Reigate.**—SEWERS.—Reigate Town Council invites tenders for the construction of about 1,320 lin. yds. in all of sewers in Station-road, Rees's-road, High-street, Brighton-road footpath, and Somerset-road, Meadvale, in accordance with the plans, sections, and specifications prepared by Mr. F. T. Clayton, C.E., the Borough Engineer and Surveyor. Bills of quantities, and forms of tender can be obtained on application at the office of the Engineer, Municipal-buildings, Reigate, where the said plans, sections, specifications, and general conditions may also be inspected. Sealed tenders, which must be on the forms supplied, giving the names and addresses of two sureties, are to be sent to Mr. Alfred Smith, Town Clerk, at the Municipal-buildings, endorsed "Tender for Sewers," not later than noon on September 8.

SEPTEMBER 10.—**Austwick.**—SEWAGE WORKS.—Settle R.D.C. invite tenders for the providing and laying of about 3,943 lin. yds. of 9-in., 8-in., and 6-in. internal diameter socketed glazed stoneware and cast-iron pipe sewers, the construction of manholes, lampholes, ventilators, and flushing chambers; the laying-out of about 4 acres of land for filtration purposes, with screening chamber, distributing carriers, embankments, and fencing, etc., together with other necessary works in connexion with the above sewerage scheme at Austwick. Plans, specification, and conditions may be seen, and quantities and tender forms obtained, on application to the Council's Engineer and Surveyor, Mr. T. A. Foxcroft, Town Hall, Settle, and sealed tenders, marked "Austwick Sewerage," which may be for the whole of the works, or for Contracts Nos. 1 or 2 separately, should be delivered to Mr. T. E. Pearson, Clerk to the Council, Council Offices, Town Hall, Settle, not later than September 10.

* SEPTEMBER 10.—**Hendon.**—MAKING-UP ROAD.—The Hendon U.D.C. invite tenders for certain works of kerbing, channelling, metalling, tar paving, gullies, etc., and other works in fully making-up the first portion of Stanley-road, West Hendon. Drawings and specifications may be seen, and forms of tender obtained, on application to Mr. S. Slater Grimley, Council's Engineer, Hendon, N.W., on deposit of 10*l.* Sealed tenders, endorsed "Private Improvements," addressed to the Chairman of the Council, to be sent to Mr. H. Humphries, Clerk, Council Offices, The Burroughs, Hendon, N.W., before 4 p.m., September 10.

SEPTEMBER 10.—**London.**—PIPE LAYING.—Metropolitan Water Board invite tenders for the laying and jointing, etc., of 42-in. and other cast-iron pipes between Child's Hill and Cranley-gardens, and other necessary work in connexion therewith. Forms of tender, with schedule and conditions of contract, may be obtained, and drawings inspected, upon application to the Engineer, at "The Firs," Southern-road, Fortis Green, East Finchley, N., between the hours of 10 and 4 (except on Saturdays). Tenders, enclosed in sealed envelopes, addressed to the Clerk of the Board, and endorsed "Tender for Pipe Laying, etc., Child's Hill to Cranley-gardens," must be delivered at the offices of the Board not later than 10 a.m. on September 10.

SEPTEMBER 10.—**Steps.**—DRAINAGE.—The District Committee of the Lower Ward of the County of Lanark invite tenders for providing, laying, and jointing about 5,200 lin. yds. of sewers from 6 in. to 15 in. diameter, building manholes, etc., and carrying out other relative work. Drawings may be seen at the office of Messrs. Warren & Stuart, civil engineers, 94, Hope-street, Glasgow, where copies of the specification and schedule of quantities may be obtained on payment of 1*l.* 1s. An assistant engineer will meet intending offerers at Steps Station at 10 a.m. on September 4 to point out the line of the pipe tracks. Sealed offers, endorsed "Steps Drainage," to be lodged with Mr. William H. Hill, Clerk to the District Committee, 194, Ingram-street, Glasgow, not later than 12 noon on September 10.

SEPTEMBER 10.—**Warkworth.**—LAYING PIPES.—The R.D.C. of Alnwick invite tenders for providing and laying about 606 yds. of 3-in. cast-iron socket pipes and fittings in the streets of Warkworth. The plan and specification may be seen at the office of the Clerk, Mr. H. W. Walton, Alnwick, to whom sealed and endorsed tenders are to be delivered before 1.30 p.m. on September 10. Mr. M. Temple Wilson, M.R.San.I., Inspector and Surveyor, Alnwick.

SEPTEMBER 10.—**Whickham.**—PIPE SEWERS.—Whickham U.D.C. invite tenders for the laying of about 550 lin. yds. of 12-in. and about 2,500 lin. yds. of 9-in. gravitating socketed stoneware pipe sewers, erection of ejector stations, air compressing station, etc., and other works in connexion therewith for the sewerage of Marley Hill and Sunniside. Plans and specification may be seen, and other particulars obtained (by appointment), on application to the Council's Surveyor, Mr. J. B. Renton, Council Offices, Whickham. Tenders, in sealed envelope, to be delivered to Mr. Thomas Lambert, Solicitor, Clerk to the Whickham U.D.C., Town Hall, Gateshead, not later than noon on September 10.

SEPTEMBER 11.—**Crewe.**—BACK PASSAGE MAKING.—The Crewe Town Council invite tenders for the making of the back passages leading from Walthall-street to Westminster-street, and behind Lewis-street, in accordance with plans, etc., which may be seen, and all other necessary information obtained, upon application to Mr. G. Eaton-Shore, Borough Surveyor, Earle-street, Crewe. A deposit of 1*l.* will be required. Sealed tenders and schedule of prices upon printed forms, to be obtained from the Borough Surveyor, must be delivered at office of Mr. Frederick Cooke, Town Clerk, Municipal Offices, Crewe, not later than 9 o'clock a.m. on September 11, endorsed "Tender for Back Passage Making."

SEPTEMBER 11.—**Dedham.**—DRAINAGE.—Lexden and Winstree R.D.C. invite tenders for Dedham drainage. The contract will comprise stoneware pipe sewers, 9 in. and 6 in. diameter, with manholes, etc., and construction of small pumping station, concrete tanks, percolating filters, etc. Plans, conditions, and specification may be seen, and copies of quantities and form of tender obtained, from the engineers, Messrs. Sands & Walker, Milton-chambers, Nottingham, between the hours of 9 a.m. and 6 p.m., on payment of 3*l.* 3s (by cheque). Sealed and endorsed tenders to be sent to Mr. C. H. Tompson, Clerk to the Council, Victoria-chambers, Colchester, on or before September 11.

* SEPTEMBER 12.—**Kingston-upon-Thames.**—PAVING, ETC.—The Corporation invite tenders for levelling, paving, metalling, flagging, channelling, sewering, and lighting Chesham-road, in accordance with plans, etc., by Borough Surveyor, which can be seen at the Municipal Offices, where forms of tender can be obtained. Tenders, endorsed "Tenders for Chesham-road," to be delivered to the Town Clerk on September 12.

SEPTEMBER 15.—**Chesham.**—ROAD WORKS.—The Chesham U.D.C. invite tenders for the completion of certain private street works (including metalling, paving, and relaying, kerbing, and channelling) in Stanley-avenue, situate within the Urban District of Chesham. Plans, sections, and specification may be seen upon application to Mr. Percy C. Dormer, Surveyor and Waterworks Engineer, Council Offices, Chesham. Tenders, sealed, and endorsed "Stanley-avenue," to be delivered to Surveyor on or before September 15, at 10 a.m.

SEPTEMBER 15.—**Northwich.**—STREETS.—The U.D.C. of Northwich invite tenders for the making-up of private streets within the district, according to plans and specifications prepared by the Surveyor of the Council. Full particulars may be obtained on application to the Council Offices, and separate tenders, which may be enclosed in an envelope, marked "Tenders for Streets," must be delivered to Mr. J. Arthur Cowley, Clerk of the Council, not later than September 15.

SEPTEMBER 17.—**Llandudno.**—ROAD CONSTRUCTION.—Llandudno U.D.C. invite tenders for the execution of certain works of road construction on land to be known as "Mostyn Broadway." The works comprise surface water drains, macadam roads, gravelled footpaths, laying of kerbs and channels, fencing, etc. Length, about 800 yds.; width, 20 yds. Plans may be seen, and specification, quantities, and form of tender obtained, with all other particulars, upon application to Mr. E. P. Stephenson, Engineer to the Council, Town Hall, Llandudno. A deposit of 1*l.* 1s. (by cash or postal order) is required. Tenders, endorsed "Mostyn Broadway Tender," to be

sent in to Mr. Alfred Conolly, Clerk to the Council, Town Hall, Llandudno, on or before 12 noon on September 17.

* SEPTEMBER 17.—**Notting Hill.**—DRAINAGE AND SANITARY.—The Guardians of St. Marylebone invite tenders for redrainage and sanitary work at the Nurses' Home, St. Marylebone Infirmary, Rackham-street, Notting Hill, W. Specification and drawing may be inspected, and bills of quantities and form of tender obtained from September 7 to September 11, between 10 a.m. and 4 p.m. (Saturday 10 and 1), upon application to the Guardians' Architect, Mr. A. Saxon Snell, of 22, Southampton-buildings, Chancery-lane, W.C., and depositing 10*l.* Tenders, endorsed "Tender for Redrainage and Sanitary work at Nurses' Home," and addressed and delivered to Mr. H. T. Dudman, Clerk to the Guardians, Northumberland-street, Marylebone-road, W., before 10.30 a.m., September 17.

SEPTEMBER 19.—**Leigh-on-Sea.**—GAS MAINS.—Leigh-on-Sea U.D.C. invite tenders from competent contractors for the work required to be done in carting, excavating for, laying, jointing, and completing 776 lin. yds., or thereabouts, of 4-in. diameter, and 100 lin. yds. of 3-in. diameter, cast-iron gas mains for Hadleigh-road, Station-road, and Victoria-drive. Quantities may be obtained, and plans and specifications seen, on application to Mr. John W. Liversedge, C.E., Surveyor to the Council. Tender to be signed, sealed, and delivered to the Council, Mr. Carlyle Croasdell, on or before September 19, endorsed "Tender for Gas Mains."

SEPTEMBER 28.—**Pewsey.**—WELL AND BOREHOLE.—Pewsey R.D.C. invite tenders for sinking of a well, 10 ft. internal diameter, and 90 ft. deep, and for sinking from the bottom of such well a borehole, 12 in. internal diameter, and a further 110 ft. deep, together with other work in connexion therewith at Pewsey. The drawing and specification may be seen at office of Mr. S. B. Dixon, Clerk to the Pewsey R.D.C., Pewsey, from 10 a.m. to 5 p.m. each day except Saturdays. Copies of specification and form of tender and schedule may be obtained from the engineers (Messrs. Fairbank & Son, C.E., Lendal-chambers, York), on deposit of 3*l.* 3*s.* Sealed tenders, endorsed "Tender for Well and Borehole, Contract A," must reach the Clerk on or before 10 a.m. on September 28.

No DATE.—**Wolsingham.**—TAR PAVING.—The Weardale R.D.C. invite tenders for laying down about 798 super. yds. of tar paving for footpaths, near Wolsingham. Particulars may be obtained from Mr. Geo. W. Egglestone, Highway Surveyor, Stanhope, R.S.O., Co. Durham.

STONE, MATERIALS, AND STORES.

SEPTEMBER 4.—**East Stonehouse.**—STORES.—U.D.C. of East Stonehouse invite tenders for the supply and delivery of the following, for the period ending March 31, 1907:—Bricks; buff paving bricks; Portland cement; lias lime; stoneware gullies, pipes, bends, etc.; slates (all classes); white lime; building stone; kerbing; channelling and granite setts; bass brooms, wicker maunds; cast-iron gullies; cast-iron hydrants, frames, and covers; cast-iron meter frames and covers; cast-iron valve covers; cast-iron stop cock blocks and covers; cast-iron manhole frames and covers; rain-water guttering; hardware. Form of tender and specifications of the whole of the above may be obtained upon application to Mr. Bernard Townshend, A.M.Inst.C.E., Surveyor to the Council, Surveyor's Office, Town Hall, East Stonehouse, Devon. Sealed tenders, endorsed "Tender for ——," are to be delivered at office of Surveyor on or before 12 o'clock noon, September 4.

SEPTEMBER 5.—**Falkirk.**—STORES.—Cross' Chemical Company, Ltd., Falkirk, invite tenders for the supply of stores for their Camelon Chemical Works, Falkirk, for twelve months from October 1, 1906. The various requirements comprise bolts, nuts, steam and gas pipes, nails, iron barrows, oils, shovels, picks, rubber, asbestos, etc. Complete schedule can be obtained on application to Mr. Thos. Thornley, Camelon Works, Falkirk, to whom sealed offers must be sent not later than September 5.

SEPTEMBER 5.—**Glasgow.**—STORES.—Alexander Cross & Son, Ltd., Glasgow, invite tenders for the supply of stores for their Port Dundas Chemical Works, Glasgow, for twelve months from October 1, 1906. The various requirements comprise bolts, nuts, steam and gas pipes, nails, iron barrows, oils, shovels, picks, rubber, asbestos, etc. Complete schedule can be obtained on application to Mr. Thos. Thornley, 19, Hope-street, Glasgow, to whom sealed offers must be sent not later than September 5.

SEPTEMBER 8.—**Stamford.**—GRANITE.—Stamford Town Council invite tenders for about 700 tons of X and 300 tons of XX broken granite, to be delivered free in trucks at Stamford Station as and when required during the months from September to March inclusive. Tenders, with samples, to be sent to Mr. Fredk. R. Ryman, A.M.Inst.C.E., Borough Surveyor and Engineer, 8, St. Mary's-street, Stamford, on or before September 8.

SEPTEMBER 10.—**Bradford.**—TIMBER.—Bradford Corporation invite tenders for the supply of timber, as undermentioned, to be delivered in quantities as required, namely:—plain oak, wainscot oak, English oak, American ash, English ash, yellow pine, birch, pitch-pine, mahogany, teak and Kauri pine, American white wood, and red wood. Forms of tender and conditions may be had on application at the General Manager's office, 15, Bridge-street, Bradford. Tenders, endorsed "Tender for Timber," must be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than September 10.

SEPTEMBER 11.—**Edmonton.**—PAVING STONE.—The Edmonton U.D.C. invite tenders for the supply and delivery at the Lower Edmonton Station of the Great Eastern Railway, of about 1,190 (or thereabouts) sq. yds. of adamant, John Ellis & Son's, imperial Victoria indurated, or shap granite stone paving for footways. Forms of tender, and full particulars, may be obtained on application to Mr. G. Eedes Eachus, the Engineer and Surveyor to the Council, Town Hall, Lower Edmonton. Sealed tenders, which must be upon the forms supplied by the Council, endorsed "Tender for Paving Stone," must be delivered at office of Mr. Wm. Francis Payne, Clerk of the Council, Town Hall, Lower Edmonton, not later than 12 o'clock noon on September 11.

SEPTEMBER 13.—**Gosport.**—MATERIALS.—Gosport and Alverstoke U.D.C. invite tenders for the supply of the following materials, etc., for the year ending September 29, 1907:—Broken stone for macadamising; kerb, channel, and setts; artificial paving stone; stoneware drain pipes; cement and lime; castings; ironmongery; disinfectants; brooms, etc.; forage; repairs to picks, etc.; repairs to harness, etc.; shoeing horses; horse hire, etc.; printing; coal; hospital necessaries; repairs to firemen's boots. Specifications, forms of tender, etc., may be obtained from the Surveyor to the Council, Mr. H. Frost, Town Hall, Gosport. Tenders, sealed and endorsed "Tender for——," as the case may be, should be delivered, with any necessary samples, at the Offices of the Council, not later than 12 o'clock noon on September 13.

SEPTEMBER 15.—**Hale.**—SUPPLIES.—Hale U.D.C. invite tenders for the supply of granite macadam, limestone, kerbs, channels, stoneware, and earthenware pipes, cinders, and other ballast, ironmongery, brushes, and other tools, oils, cement, disinfectants, tar, etc. for a period of twelve months, commencing October 1, 1906. Forms of tender, and further particulars, may be obtained at office of Mr. F. E. Boaz, Surveyor, Council Offices, Hale, Cheshire, between the hours of 9 a.m. and 5 p.m., to which all enquiries should be addressed. Tenders to be forwarded not later than September 15 to Mr. J. G. Whyatt, Clerk to the Council.

SEPTEMBER 18.—**Fleet.**—MACADAM.—Fleet U.D.C. invite tenders for the supply on rail at Fleet Station (Hants) of 250 tons of Cleo Hill, or similar quality, macadam, broken to 2-in. gauge. Tenders, duly endorsed, must be delivered to Mr. W. H. Wright, Clerk to the Council, Albert-street, Fleet, Hants, not later than 5 p.m. on September 18.

SEPTEMBER 19.—**Leigh-on-Sea.**—PIPES.—Leigh-on-Sea U.D.C. invite tenders for the supply and delivery of 22 tons, or thereabouts, of 4-in diameter and 3-in. diameter cast-iron pipes and specials. Particulars may be obtained on application to Mr. John W. Liversedge, C.E., Surveyor to the Council. Tenders to be signed, sealed, and delivered to the Clerk to the Council, Mr. Carlyle Croasdell, not later than September 19.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Mgrs. of W. Lon. Dist. Schls.	4*l.* per week	Sept. 4
*CLERK OF THE WORKS	Walthamstow Educatn. Com.	3*l.* 10*s.* per week	Sept. 10
*INSTRUCTOR IN WOODWORK	Boro. Polytechnic Institute...	130*l.*	Sept. 12

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*50 000 PIECES OF WALL PAPER—3, Redcross-street, E.C.	Fryer, Cooper, & Co.	Sept. 4
*BUILDER'S PLANT AND STOCK, ETC., EALING—On the Premises, The Grove, Ealing	Robt. Newman	Sept. 11 & 12
*BRICK-MAKING PLANT—Abbey Brickfields, Faversham	Jackson & Sons	Sept. 18
*BUILDER'S PLANT AND STOCK, WANDSWORTH—On the Premises	J. T. Skelding	Sept. 19
*BRICK-MAKING PLANT AND MACHINERY, CATFORD—On the Premises	J. T. Skelding	Sept. 27
*FREEHOLD BUILDING LAND, SHREWSBURY—The County Mart, Shrewsbury	Wm. Hall, Wateridge, & Owen	Sept. 28
*JOINERY WORKS HENRY-STREET, GRAY'S-INN-ROAD	May & Rowden	Oct. 3
*FREEHOLD PROPERTIES, GODALMING—King's Arms Hotel, Godalming	Messrs. Mellersh	Oct. 9

PATENTS.—*Continued from page 285.*

the hot fire-brick hearth from the floor and preventing the firing of the joists, and a movable front for closing the front of the chambers.

17,556 of 1905.—G. A. CHADDOCK: *Windows and Window Sashes.*

This relates to windows and window sashes, which consists in arranging the sashes with grooves, which slide over tongues fitted in the frames, the tongues for the lower and upper sash reaching to approximately the middle point of the frame of the window, and in arranging further guides or inlay strips in the side of the groove of the sash extending for the whole height of the frame.

19,926 of 1905.—W. A. MURCOTT: *A Lead Jointless Flush Pipe for a Water-closet Siphon Cistern.*

This relates to a method of fixing a lead flush pipe to a water-closet cistern by placing the ends of various lengths of lead piping in metal moulds or dies, and by heating the said moulds or dies until the lead pipe melts and takes the form of the inside of the moulds or dies, thereby producing a lead pipe with a collar or flange, this flange or collar enabling the lead flush pipe to be screwed up to the cistern direct with the aid of a brass cap.

22,805 of 1905.—R. MACKAY: *Apparatus for Heating Water by Steam.*

This relates to an apparatus for heating water by steam, consisting of an outer casing having a water inlet towards its lower part and a water outlet at some distance below the top of the apparatus, an inner casing closed at its top and bottom having a steam inlet towards its upper end, an inner tube open at both ends and passing through the top of the outer casing to near the bottom of the inner casing.

23,871 of 1905.—J. HIGGINBOTHAM: *Access and Test Junction Pipe for Drains.*

This relates to a double access and test junction pipe for drains, consisting of a spigot or socket junction, the open access end directly or partially over the spigot end and capable of being closed by a cap or covered; and a socket or spigot connexion at right angles to the spigot end connecting to the main house drain and located as close as possible to the open access end.

5,438 of 1906.—A. MERILLOD: *Portable Heat Radiators for Stoves.*

This relates to a portable heat radiator for room stoves, consisting of a cylindrical or ball-shaped or other suitable shaped hollow body with open bottom and closed top adapted to be placed with its edge provided at the bottom into a corresponding edge of a room stove with open top.

11,153 of 1906.—R. R. MAIN, J. J. CAMERON, and T. COX: *Wire Fencing.*

This relates to a dropper for use in wire fencing or trellising composed of two or more lengths of material such as rods or bars or twisted or stranded wires jointed or linked together.

12,488 of 1906.—HERDE UND OFENFABRIK COMMANDITGESELLSCHAFT, F. A. C. GUTJAHR & CO.: *Electrically Heated Stove.*

This relates to a stove adapted for the insulation and storage of heat, comprising an electric heating device located within the internal cavity thereof, the arrangement being such that in consequence of the extending surface of the stove the heat stored up therein is radiated and diffused in a substantially uniform manner, whilst the superheating of the air and too rapid cooling are avoided.

14,796 of 1906.—D. R. POLLARD: *Device for Securing and Fastening Roofing Slates or Tiles.*

This relates to a slating strip, and consists in the combination with a slot for securing the clip and means for adjusting the position of the clip upon the batten or the like of an index or gauge for determining the position of the strip with regard to the slate to be secured.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Aug. 9.—By E. J. GILDERS (at Clacton).

Clacton, Essex.—"Rose Cottage," f., y.r. 40*l.* £520
Holland-rd., two freehold enclosures, 1 a. 2 r. 32 p. 178
Holland-rd., freehold cottage, blacksmith's shop, etc. 305
Old-rd., The Clacton Windmill and 1 a. 1 r. 17 p., f. 510
Cotswold-rd., 14 freehold building sites 474

Aug. 14.—By MADDISON, MILES, & MADDISON (at Great Yarmouth).

Gorleston-on-Sea.—20 to 23, Nelson-rd., f. 575
Burgh Castle, Suffolk.—Two freehold marshes, 14 a. 0 r. 25 p. 480
Great Yarmouth.—52, Ipswich-pl., f. 265
11, St. Peter's-rd., f., y.r. 20*l.* 412

Aug. 16.—By E. J. GILDERS (at Clacton).

Great Holland, Essex.—The Lower Farm, 216 a. 2 r. 21 p., f. 1,875
Clacton, Essex.—Central-av., seven freehold building plots 181
Beaconsfield-rd., "Valetta," f., y.r. 34*l.* 520
Old-rd., fishmonger's shop and house, f., y.r. 42*l.* 600

Aug. 17.—By G. B. HILLIARD & SON (at Chelmsford).

Little Baddow, Essex.—Cuckoos and Pulcherins Farms, 130 acres, f., including timber 2,292

Aug 20.—By G. B. HILLIARD & SON.

Wickford, Essex.—Little Bromfords Farm 113 a. 1 r. 33 p., f. 1,750

By HUGH SWORDER.

Hampstead.—9, Ariel-rd., u.t. 71 yrs., g.r. 7*l.* 10*s.*, y.r. 33*l.* 280
Leyton.—116, St. George's-rd., f., e.r. 28*l.* 245
Enfield Wash.—Market-pl., three freehold s. and houses, w.r. 78*l.* (one moiety) 365

Aug. 22.—By CLOUGH & CO. (at Denbigh).

Llanfairtalhaiarn, Denbigh.—Ty Canol, Ty Issa, Geualit, and Pont-yr-Aled Farms, 239 a. 1 r. 27 p., f. 6,130
Bettws-Gwerfilgoch, Merioneth.—Bryn-gulen Holding, 4½ acres, f. 126

Aug. 23.—By E. JACKSON.

Brixton.—51, Beechdale-rd., u.t. 84 yrs., g r. 7*l.*, y.r. 40*l.* (undivided moiety) 215
Tooting.—28 and 30, Moffat-rd., u.t. 85 yrs., g.r. 4*l.*, w.r. 62*l.* 8*s.* 390

By CHARLES VARLEY.

Stoke Newington.—55, Mildmay-pk., f., e.r. 65*l.* 850

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h for public-house; o. for office; s. for shops; ct. for court.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 10 0	per 1000 alongside, in river.
Bough Stocks and Grizzles	1 7 0	" " "
Picked Stocks for Facings	2 17 6	"
Flettons	1 8 0	" delivered at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	12	0	0	"	" "
Headers	11	0	0	"	" "
Quoins, Bullnose, and Flats	16	0	0	"	" "
Double Stretchers	19	0	0	"	" "
Double Headers	16	0	0	"	" "
One Side and two Ends	19	0	0	"	" "
Two Sides and one End	20	0	0	"	" "
Splays, Chamferred, Squints	20	0	0	"	" "
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	"	" "
Quoins, Bullnose, and Flats	14	0	0	"	" "
Double Stretchers	15	0	0	"	" "
Double Headers	14	0	0	"	" "
One Side and two Ends	15	0	0	"	" "
Two Sides and one End	15	0	0	"	" "
Splays, Chamferred, Squints	14	0	0	"	" "
Second Quality White and Dipped Salt Glazed	2	0	0	"	less than best.

BRICKS, &c. (*continued*).

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" "
Best Portland Cement	27 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11*s.* 6*d.* per yard, delivered.
Stourbridge Fireclay in sacks	27*s.* 0*d.* per ton at rly. dpt.

STONE

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "

HARD YORK—

Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super., "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

	s. d.	
Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. sawn both sides random slabs	1 0	" "
" " " 2 in. do.	0 8½	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality "	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz.
Best Broseley tiles	50 0	per 1000 "
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	" "
Do. Ornamental do.	60 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 "
Do. Ornamental do.	54 6	" "
Hip tiles	4 1	per doz. "
Valley tiles	3 8	" "
Best "Rosemary" brand plain tiles	48 0	per 1000 "
Best Ornamental tiles	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 8	" "
Best "Hartshill" brand plain tiles, sand-faced	50 0	per 1000 "
Do pressed	47 6	" "
Do. Ornamental do.	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 6	" "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	...	15 0 0
Deals: best 3 by 9	13 0 0	...	14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	...	12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0		less than 7 in. and 8 in.
Deals: seconds	1 0 0		less than best.

WOOD (*continued*).

BUILDING WOOD (*continued*)—	At per standard. £ s. d.		£ s. d.
Battens: seconds	0 10 0		less than best.
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	...	10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	...	9 10 0
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0 10 0		more than battens.
¾ in.	1 0 0		

	At per load of 50 ft.		
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	...	5 0 0
Seconds	4 0 0	...	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	...	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	...	3 10 0
Swedish balks	2 10 0	...	3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	...	4 15 0

JOINERS' WOOD.	At per standard. £ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	...	25 0 0
3 in. by 9 in.	22 0 0	...	23 0 0
Battens, 2½ in. and 3 in. by 7 in.	6 10 0	...	18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0	...	20 0 0
" " 3 in. by 9 in.	17 10 0	...	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	...	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	...	12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	...	22 10 0
Do. 3 in. by 9 in.	18 0 0	...	19 10 0
Battens	13 10 0	...	15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	...	17 0 0
Do. 3 in. by 9 in.	14 10 0	...	16 0 0
Battens	11 0 0	...	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	...	14 0 0
Do. 3 in. by 9 in.	12 10 0	...	14 0 0
Battens	10 0 0	...	11 0 0
White Sea and Petersburg—First white deals, 3 in. by 11 in.	14 10 0	...	15 10 0
" " 3 in. by 9 in.	13 10 0	...	14 10 0
Battens	11 0 0	...	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	...	14 10 0
" " 3 in. by 9 in.	12 10 0	...	13 10 0
" " battens	10 0 0	...	11 0 0
Pitch-pine: deals	18 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow Pine—First, regular sizes	44 0 0		upwards.
Oddments	32 0 0		"
Seconds, regular sizes	33 0 0		"
Yellow Pine oddments	28 0 0		"
Kauri Pine—Planks, per ft. cube	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—Large, per ft. cube	0 3 0	...	0 3 6
Small " "	0 2 6	...	0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¾ in. do. do	0 0 7	...	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	...	0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	17 0 0	...	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	...	0 5 0

Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 0
¾ in. by 7 in. white " "	0 10 0	...	0 11 6
1 in. by 7 in. " " "	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	...	7 10 0
Compound Girders, ordinary sections	9 0 0	...	10 0 0
Steel Compound Stanchions	12 0 0	...	13 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	...	10 0 0
Flitch Plates	9 0 0	...	10 0 0
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	...	8 10 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—Common Bars	8 0 0	...	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	...	9 0 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 0 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—
("And upwards, according to size and gauge.)			
Sheet Iron Black—Ordinary sizes to 20 g.	9 10 0	...	—
" " 24 g.	10 10 0	...	—
" " 26 g.	12 0 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	14 10 0	...	—
" " 26 g.	15 0 0	...	—
Sheet Iron, Galvanised, flat, best quality—Ordinary sizes to 20 g.	17 0 0	...	—
" " 22 g. and 24 g.	17 10 0	...	—
" " 26 g.	19 0 0	...	—
Galvanised Corrugated Sheets—Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0 0	...	—
" 22 g. and 24 g.	14 10 0	...	—
" 26 g.	15 15 0	...	—

METALS (continued).

	Per ton, in London. £ s. d.			£ s. d.
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 10 0	...		—
Best Soft Steel Sheets, 22 g. & 24 g.	12 10 0	...		—
26 g.	14 15 0	...		—
" " "	9 10 0	...		9 15 0
Cut Nails, 3 in. to 6 in. (Under 3 in., usual trade extras.)				

LEAD, &c.

	Per ton, in London. £ s. d.			£ s. d.
LEAD—Sheet, English, 3lb. and up	20 0 0	...		—
Pipe in coils	20 10 0	...		—
Soil pipe	23 0 0	...		—
Compo pipe	23 0 0	...		—
ZINC—Sheet—				
Vieille Montagne ton	33 0 0	...		—
Silesian	32 15 0	...		—
COPPER—				
Strong Sheet per lb.	0 1 1	...		—
Thin " "	0 1 2	...		—
Copper nails "	0 1 0	...		—
BRASS—				
Strong Sheet "	0 1 0	...		—
Thin " "	0 1 1	...		—
TIN—English Ingots "	0 1 9	...		—
SOLDER—Plumbers' "	0 0 8½	...		—
Tinmen's "	0 0 10½	...		—
Blowpipe "	0 0 11½	...		—

* By an oversight the price of lead was not corrected last week. It should have been £19 15s., not £19 7s. 6d.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1¾d. " "
21 oz. thirds	3¼d. " "
" fourths	2½d. " "
26 oz. thirds	4¼d. " "
" fourths	3¼d. " "
32 oz. thirds	5d. " "
" fourths	4¼d. " "
Fluted Sheet, 15 oz.	3¼d. " "
" 21 oz.	4¼d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

½ Hartley's	2½d. per ft. delivered.
⅜ "	2¼d. " "
¼ "	3d. " "
Figured and Oxford Rolled "Oceanic" Glass, white	4d. " "
Do. " tinted	5¼d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 10
" " " in barrels	"	0 1 11
" " " in drums	"	0 2 1
Boiled " " in pipes	"	0 2 0
" " " in barrels	"	0 2 1
" " " in drums	"	0 2 3
Turpentine in barrels	"	0 3 8
" in drums	"	0 3 10
Genuine Ground English White Lead	per ton	£3 0 0
Red Lead, Dry	"	£2 0 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

AUCHTERLESS (N.B.)—Accepted for alterations and additions to Badenscoth School. Messrs. J. Duncan & Son, architects, Turriff:—

Mason: J. Mitchell, Huntly
Carpenter: W. H. Skene, Turriff
Slater: G. Glenine, Nisch
Plasterers: A. & J. Fordyce, Turriff
Plumber: C. Duthie & Sons, Turriff
£170 16

BASFORD.—For extension of outfall mains, Basford, etc., and construction of outfall tanks, filters, pumphouse, etc., for Wolstanton United Urban District Council. Mr. W. F. Slater, Engineer and Surveyor, Overhouse-chambers, Burslem. Quantities by the engineer:—

—	No. 1 Estimate. £. s. d.	No. 2 Estimate. £. s. d.	Both. £ s. d.
J. Taylor & Son	1,245 5 6	6,051 19 0	7,897 4 6
H. Wardle	—	—	6,588 19 10
F. Barke	887 5 9	5,431 14 3	6,329 0 0
Bennett Bros.	812 0 0	5,496 0 0	6,308 0 0
J. Owen	—	—	6,299 0 0
J. Grant	900 0 0	5,290 0 0	6,190 0 0
S. Heath	1,171 0 0	4,900 0 0	6,071 0 0
W. Williams	820 0 0	5,100 0 0	5,920 0 0
J. Cooke	1,029 10 0	4,595 0 0	5,624 0 0
S. Wilton	849 0 0	4,595 0 0	5,444 0 0
F. Mitchell & Son	861 16 3	4,561 11 3	5,423 7 6
Sanders & Torrance, Broad-street, Hanley*	845 0 0	4,389 0 0	5,234 0 0
W. Bullock	864 0 0	—	—
W. F. Slater	—	—	5,500 0 0

BECCLES.—For alterations and additions at The Ship Inn, for Messrs. R. & G. Morse, brewers, Lowestoft. Mr. Arthur Pells, F.S.I., architect, Beccles:—

H. A. King	£292	Hipperson Bros.	£263
Hindes & Co.	284	G. Elsey, Lowestoft*	228

BEDALE.—For building new Wesleyan Sunday School, for the Trustees. Mr. A. G. Dalzell, architect and surveyor, Halifax:—

Bricklayer and Mason: T. Braithwaite, Leeming Bar, Bedale* £270 18
Joiners and Carpenters: J. Megson & Son, Market Place, Bedale* 151 14
Plumber: J. K. Pearson, Market-place, Bedale* 28 15
Painters: Bucktrout & Firth, Bedale* 10 0

BRADFORD.—For the enlargement of the head post-office, for the Commissioners of H.M. Works and Public Buildings:—

		Credit.
J. Schofield & Son	£9,863 0 0	£50 0 0
M. Booth & Sons	9,400 0 0	134 0 0
J. Moulson & Son, Ltd.	8,840 0 0	55 0 0
C. Murgatroyd & Son, Ltd.	7,958 0 0	150 0 0
E. Fearnley & Sons	7,500 0 0	100 0 0
W. Farnish*	7,300 0 0	125 0 0
J. Arundel	6,380 15 0	70 8 6

BUCKNALL.—For painting the Infectious Diseases Hospital, Bucknall, Stoke-on-Trent, for Hanley, Stoke, Fenton, and Longton Joint Hospital Board. Mr. E. Jones, Architect, 10, Albion-street, Hanley:—

A. Shaw & Co.	£124 17 9	T. Bickley & Co.	£93 10 0
G. Taylor & Sons	119 15 0	H. Harland & Co.	91 7 0
P. H. Bennion	107 15 0	F. Griffiths	82 6 7
R. Birchall & Son	98 17 0	E. Peake	79 15 2
W. Walibanks & Son	94 10 0	T. Hughes, Hanley*	79 8 3

CATFORD.—For converting No. 3, Brownhill-road (private residence) into shop, and repairs, for Mr. J. Allder. Messrs. Norfolk & Prior, architects and surveyors, Catford Bridge:—

G. Howick	£132 15	C. Walker*	£115 11
J. Watt	128 0		

CHARFIELD (Gloucestershire).—For the erection of a pair of labourers' cottages at Starveall Farm, Charfield, Glos., for the Governors of Katharine Lady Berkeley's Grammar School. Messrs. T. Scammell, Son, & Perkins, architects and surveyors, Bristol, and Wotton-under-Edge, Glos.:—

E. Clarke	£500	A. Jotcham	£439
S. J. Simmonds	496	J. Brown	430
W. Blakes	453	J. Hawkins & Sons, Ridgeway*	395
W. Pitcher	450		

CLAYGATE.—For the erection of eight shops, Claygate, Surrey, for Mr. W. Martin. Mr. S. C. Hart, architect, 22, Philpot-lane, London, E.C.:—

Shellard	£4,200	Matthew & Co., Enfield Wash*	£3,820
West	4,075	Brown & Co.	3,804
Doughty	3,860		

COLTON (near Leeds).—For the construction of sewers, etc., for Hunslet Rural District Council. Messrs. Marriott, Son, & Shaw, engineers, Church-street-chambers, Dewsbury:—
G. L. Briggs, Halton, Leeds* £303 16

DERBY.—For enlargement of Derby Midland-road Branch Post-Office:—

		Credit.
E. Brown & Son	£3,237	£28
J. Young	3,190	20
J. Barnsley & Sons	3,148	40
Walker & Slater, Derby*	3,134	35

DESBOROUGH.—For water mains, for the Urban District Council. Mr. D. J. Diver, Surveyor, Desborough:—

Yarrow & Co., Ltd.	£157	0	5½
Watson, Gow, & Co.	153	9	1
J. & R. Ritchie	144	13	6
Sheepbridge Coal & Iron Co.	138	7	7
Holwell Iron Co., Ltd.	136	7	6
Cochrane	136	19	11
Stanton Iron Co., Nottingham*	133	5	7

ENFIELD.—For erecting first portion of new central premises, including grocery warehouse and outbuildings, for the Enfield Highway Co-operative Society, Ltd., Ordnance-road, Enfield Highway. Mr. F. Bethell, architect, 23, Queen Anne's-place, Bush-hill Park, Enfield. Quantities supplied by the architect:—

P. & R. Paul	£2,686	Lane & Harvey	£2,545
L. & W. Patman	2,684	A. Fairhead & Son	2,545
W. Lawrence & Son	2,593	Jennings & Grenfield*	2,500
E. Newman	2,578		

HALE.—For making-up Ollerbarrow-road, for the Urban District Council. Mr. F. E. Boaz, Survey r, Ashley-road, Hale, Cheshire:—

W. Clarke	£1,273 7 9	Bethell & Sons	£756 17 0
Exors. of T. Barber	889 16 6	G. Ward, Cook, & Co., Liverpool*	731 16 11
G. Boyson	846 6 7		

[Surveyor's Estimate, £764 8 9.]

HALESWORTH.—For erection of residence, for Mr. R. E. Hazard. Mr. Arthur Pells, F.S.I., architect, Beccles:—

Boddy & Son	£1,027	Howard Bros., Halesworth*	£812
A. H. Woodyard	1,020		
A. Botwright	930		

HALESWORTH.—For altering dwelling house, supplying and fixing new shop front, for Messrs. Roe & Co. Mr. Arthur Pells, F.S.I., architect:—

G. Elsey	£275	R. Morriss	£225
Gibbs & Rodwell	260	S. E. Hazell	206
A. Woodyard	237	J. C. Smith, Ipswich,*	200

HAMILTON.—For new dormitory extensions, Hamilton Combination Poorhouse. Mr. Alex. Cullen, architect, Brandon-chambers, Hamilton:—
J. & C. Fleming, Strathaven* £377 14 11½

HECKINGHAM (Norfolk).—For additions and alterations and repairs at Beacon Hill Farm, for Mr. N. H. Bacon. Mr. Arthur Pells, F.S.I., architect, Beccles:—

Hipperson Bros.	£475 0	Grimson & Chasten	£390 0
L. Elden	439 12	C. Tills*	332 0

HENDON.—For wood and corrugated iron shelter for Hendon Public Park, N.W., for the Urban District Council. Mr. S. Slater Grimley, Engineer and Surveyor, Hendon:—

	Shelter.	Extension of Veranda.
Marchant & Hirst	£296 0 0	£90 0
R. Isles & Co.	257 0 0	—
H. Parfect	227 0 0	102 0
J. J. Quarterman	225 0 0	57 10
J. McManns	203 0 0	65 0
F. Smith & Co., Ltd.	199 0 0	53 0
Barratt & Bradshaw	195 0 0	145 0
Wire Wove Roofing Co.	189 0 0	56 10
I. J. Hawkins & Co.	174 0 0	51 0
J. Harrison & Co.	160 0 0	70 0
Turpie Bros.	156 0 0	68 0
F. D. King, Hendon*	154 4 3	61 6
W. Harbrow	153 0 0	60 0

HOCKLEY.—For erecting scattered houses at Hockley, for Rochford Guardians. Messrs. Greenhalgh & Brockbank, architects, Southend:—
G. Burrill, Great Wakering* £625

HOPKINSTOWN.—For 150 lineal yds. of river retaining walls, etc., for Pontypridd Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor:—
A. G. Collins & Co., Barry* £336 6 2

HULL.—For the erection of the superstructure of the new post office, for H.M. Commissioners of Works and Public Buildings:—

G. L. Scott	£52 997	Wright & Sons	£38,150
G. H. Panton	49,900	G. H. Scorrer	37,954
Quibell, Son, & Greenwood, Ltd.	41,804	T. Marsden & Sons	37,750
J. T. Levitt	41,654	Dawber, Townsley, & Co., Ltd.	37,750
G. Houlton	39,200	Bowman & Sons	36,595
W. G. Padgett	38,720	H. Arnold & Son*	30,275
T. Goates	38,315		

LONDON.—For alterations at additional workhouse, Hazelville-road, Hornsey Rise, N., for St. Leonard, Shoreditch, Guardians. Mr. F. J. Smith, F.R.I.B.A., Parliament-mansions, Victoria-street, S.W.:—
J. Ivory, 102, Great Cambridge-street, E. £1,837

LONDON.—For painting, etc., at the relief office and dispensary, Royal Hill, Greenwich, for the Guardians. Mr. Louis Jacob, A.R.I.B.A., Globe-chambers, 493, New Cross-road:—

H. Kent	£150	A. Townsend	£103
F. Western	145	W. Bailey	99 19
W. Pinney	142	W. Mills	97 15
Hall Bros.	139	G. A. Rowley	96 10
F. Smith & Co.	136	W. Nash	95
W. Quilter	133	A. T. Peyton	95
Griggs & Son	130 10	W. Bickerton	94
W. Martin & Son, Runham, Brown, Bros.	126	T. T. Forest	90 10
	124	Lossby & Salmon	77
Oldman Bros.	112 10	E. Mills, Siebert Works, Westcombe Park*	62
W. J. Howie	110		
E. J. Wallis	104 15		

MIDDLEWICH.—For alterations and extension at No. 2 Branch, Lewin-street, for Winsford Industrial Co-operative Society, Ltd. Mr. Thomas Dutton, architect, Dingle-lane, Winsford. Quantities not supplied:—

Birchall Bros.	£407	J. Fowles & Sons, High-st., Winsford*	£390

MIDSOMER NORTON (Somerset).—For erecting schools and vestries at Stone's Cross, for the Primitive Methodists. Mr. W. Bevan, architect, Midsomer Norton:—

E. Preece	£1,398	W. & A. Edgell, Radstock*	£547
J. H. Tovey	682		
W. Tovey	589		

NORTH BERWICK.—For erecting a new Post Office, for the Commissioners of H.M. Works and Public Buildings:—

		Credit.
J. Wilson & Sons	£3,999 0 0	£20 0 0
J. Parkinson & Sons, Ltd.	3,628 0 0	—
J. Muirhead	3,478 10 10	20 0 0
S. Beattie & Sons	3,265 0 0	10 0 0
Denholm & Murray	3,161 0 0	13 0 0
P. Barton	3,000 0 0	—
A. H. Hunter & Co.	2,994 10 0	—
Scott & Brown	2,878 14 0	10 0 0
J. Elliott	2,801 16 0	3 0 0
J. & R. Stewart	2,795 0 0	10 0 0
A. Calder	2,791 0 0	—
J. & F. Forrest	2,780 3 0	—
N. McLeod & Sons	2,763 0 0	15 0 0
Baikie & Peattie	2,779 8 8	82 8 8
J. Angus*	2,769 10 0	40 0 0

NORTON-SUB-COURSE (Norfolk).—For alterations and additions to farm premises, for Mr. N. H. Bacon. Mr. Arthur Pells, F.S.I., architect, Beccles:—

Hepperson Bros.	£115 0 0	L. Elden, Loddon*	£89 5 0
C. Tills	98 0 0		
Wynes	90 0 0		

PETERBOROUGH.—For new elementary school and cookery centre at Brook-street, Peterborough, for the Local Education Authority, according to plans and quantities supplied by Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough:—

J. Cracknell	£5,534 0	D. Gray	£4,712 10
E. W. Beech	4,950 0	J. Lucas	4,649 0
H. Watson	4,849 0	J. Bridgefoot	4,631 18
R. Shanks	4,790 0	J. Hicks, Peterborough*	4,544 18
J. Guttridge	4,774 0		
G. Heath	4,712 10		

[Architects' estimate, £4,900.]

STANLEY (Derbyshire).—For the construction of waterworks at Stanley and West Hallam, for Shardlow Rural District Council. Messrs. Elliott & Brown, engineers, Burton-buildings, Parliament-street, Nottingham:—

G. F. Tomlinson, Derby* £2,185

STANLEY (Derbyshire).—For cast-iron pipes, etc., in connexion with water supply of Stanley and West Hallam, for the Rural District Council of Shardlow. Messrs. Elliott & Brown, engineers, Burton-buildings, Parliament-street, Nottingham:—

Stanton Iron Works Co., Ltd., near Nottingham* £1,591 2

STANLEY (Durham).—For erecting dwarf walls and palisading, together with cement footpaths, etc., to twenty-four houses, Council-street, for the Urban District Council. Mr. Wm. Forster, architect, Stanley:—

W. Collin	£407	R. C. Birtley	£309
Craven	375	A. Routledge	285
Dyson	310	P. Duffy, Stanley*	280

SUNDERLAND.—For the erection of Board of Trade and Customs offices, for the Commissioners of H.M. Works and Public Buildings:—

		Credit Old Material.
S. F. Davidson	£6,499	—
B. W. Lowry	5,620	—
W. B. Cooper	5,558	£50
J. C. Ferguson	5,389	—
J. B. Stott	5,346	20
D. & J. Ranken	5,224	25
T. Lumsden	4,840	40
J. W. White	4,778	—
Middlemiss Bros.	4,584	20
J. Armitage	4,450	—
J. M. Wright	4,297	—
J. Huntley	4,285	50
S. Warburton*	4,000	80

WATFORD.—For Hagden-lane sewerage, for Watford Urban District Council. Mr. D. Waterhouse, Engineer and Surveyor:—

T. C. Starkey	£777 2 2	Wilson, Border, & Co.	£580 6 4
T. Bate & Co.	675 7 8	J. Jackson	555 17 9
G. R. Mann	766 0 0	H. Brown	555 0 6
A. T. Lee	660 14 8	Bower Bros.	550 1 4
W. C. French	655 0 0	W. Barrick	525 9 0
J. Adams	653 16 2	W. Shepherd & Sons	512 17 6
Bracey & Clark	640 0 0	H. C. Zadig	509 0 0
Smith & Co.	608 9 2	W. Wilson	455 15 6
Hewitt & Son	607 2 2	W. Johnson, Minsted, Sheerness*	384 13 0
T. Free & Sons	603 8 6		
W. H. Worthington & Co.	601 10 4		

WATFORD.—For private street works, for Watford Urban District Council. Mr. D. Waterhouse, Engineer and Surveyor:—

	Mildred-avenue.	Sussex-road.
J. Mowlem & Co., Ltd.	£1,785 0 0	£712 0 0
Fry Bros.	1,736 5 8	717 1 0
G. R. Mann	1,735 0 0	688 0 0
W. Shepherd & Sons	1,715 17 6	705 16 4
Wilson, Border, & Co.	1,690 0 0	680 0 0
T. Adams	1 667 11 4	683 7 6
Hardy, Bate, & Co.	1,767 1 6	699 14 6
W. & C. French	1,650 0 0	675 0 0
T. Free & Sons	1,646 16 0	660 1 0
A. F. Lee	1,636 0 0	666 0 0
W. & D. Wilkins	1,625 0 0	—
H. & B. Watkins	1,590 0 0	656 0 0
J. Jackson	1,572 19 2	680 14 9
W. Wilson	1,555 0 0	640 0 0
Zadig & Co.	1,549 0 0	662 0 0
Bower Bros.	1,517 0 0	619 0 0
W. H. Worthington	1,508 5 3	614 3 1
J. & J. Goss	1,508 0 0	588 0 0
W. Johnson	1,470 0 0	604 0 0
H. Brown*	1,369 0 0	596 0 0
T. C. Starkey (incomplete)	596 0 0	244 6 0
Bracey & Clarke*	—	580 0 0

WHITKIRK (near Leeds).—For the construction of sewers, for Hunslet Rural District Council:—

G. L. Briggs, Halton, Leeds* £92 1 6

WOTTON-UNDER-EDGE (Gloucestershire).—For repairs and alterations to Dr. Boyce's house The Chipping, Wotton-under-Edge, for the Governors of Katharine Lady Berkeley's Grammar School. Messrs. T. Scammell, Son, & Perkins, architects and surveyors, Bristol, and Wotton-under-Edge, Gloucestershire:—

A. Jotcham	£127 0	J. Jotcham	£102 10
R. Cook	110 15	W. Pitcher	98 10
R. Keynton	109 10	J. Hawkins, Ridgeway*	98 10

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